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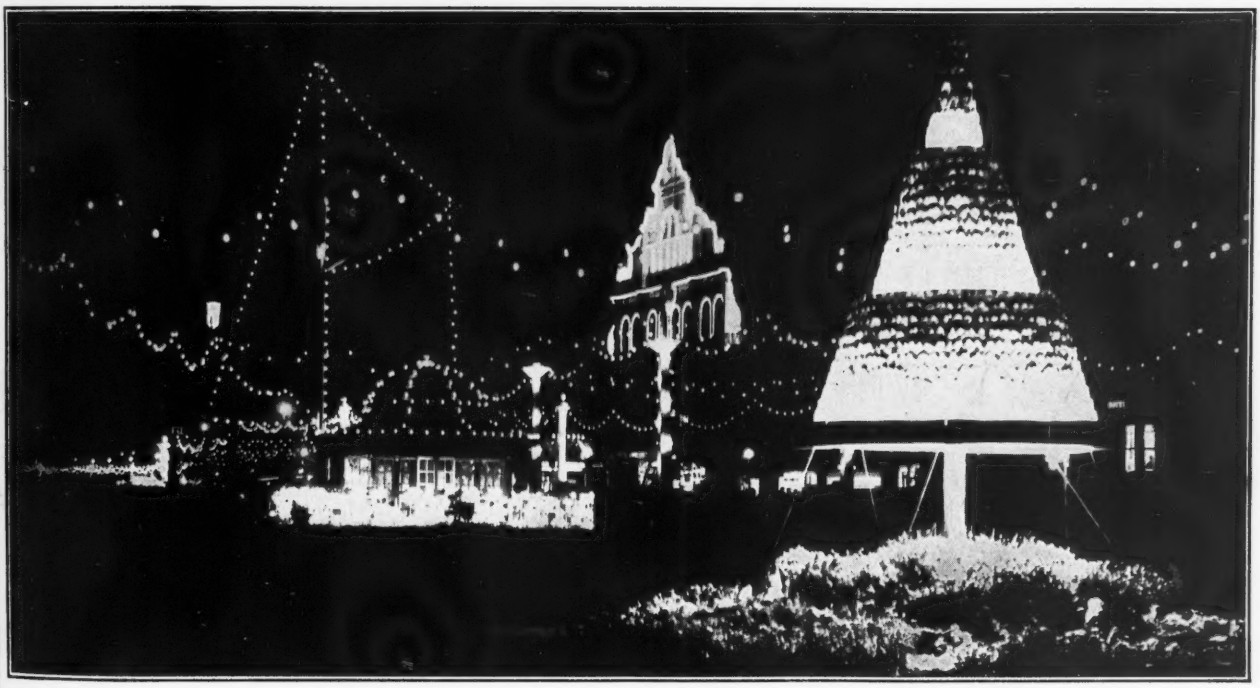
Light and Lighting

XX.—No. 3 March, 1937 Price 9d.

DECORATE WITH LIGHT



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Festoons of Lamps are, perhaps, the most decorative form of exterior illumination. Taking into consideration the low cost of current consumption and the durability of reliable equipment, it offers publicity value far in excess of the expenditure involved.

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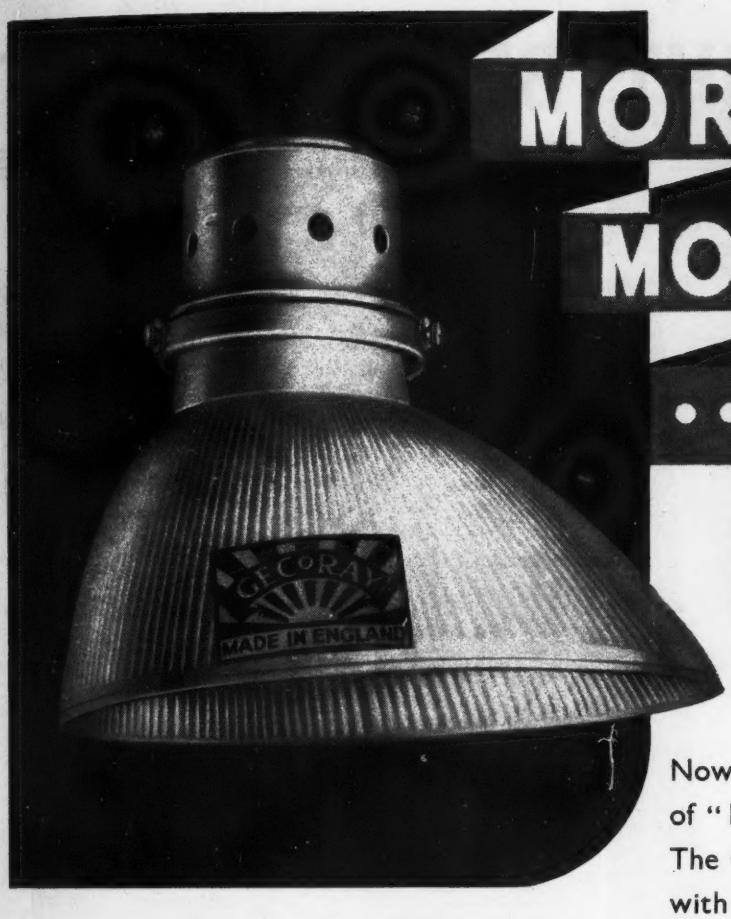

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Now is the time to start your campaign of "Brighter Shop Window Lighting." The GECoRAY system, in conjunction with Osram Lamps, provides brilliant floodlight effects at the cost of ordinary lighting. GECoRAY reflectors suit windows of any shape or size, and can be arranged to give beautiful colour combinations if required.

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The pleasure of reading is greatly enhanced by the comfort of good local lighting. In this room the general lighting plus the local standard lamp suffices to fill the corner with a gentle glow of light, avoiding contrast and heavy shadows and materially reducing eyestrain. The cost of this pleasant lighting is very low—and the benefit it brings not only in the way of comfort and ease of seeing, but in bodily health through eliminating eye-strain and the resulting headaches, is very great.

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The WESTON "Lightometer" incorporates the famous "Photronic" photo-electric cell, an exclusive WESTON feature. Small, portable and of rugged construction, it does not suffer deterioration or change in calibration, even though exposed to direct sunlight. As a double-range instrument it gives readings of 0-50 and 0-500 foot-candles.

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You can let customers test their own lighting with the

WESTON "LIGHTOMETER"

"More Light—Better Sight." This slogan is making consumers conscious of the need for more light and all that it implies in terms of lamps and fittings.

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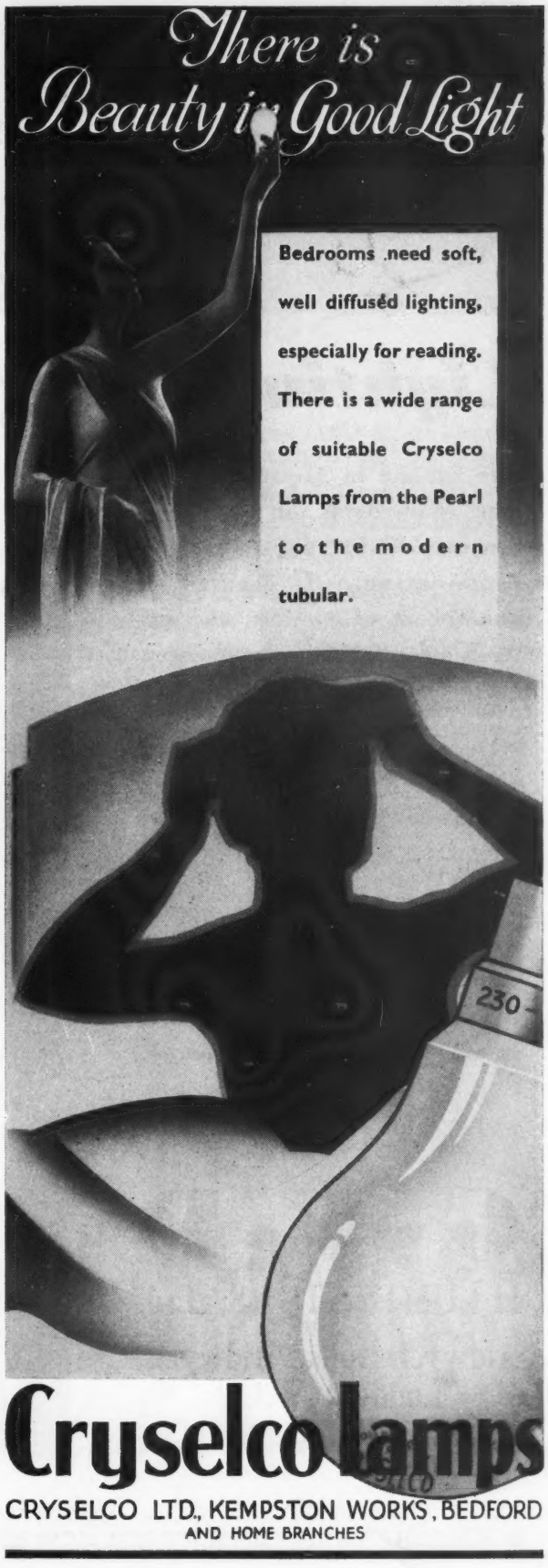
Measuring light with the WESTON "Lightometer" is "as easy as telling the time." In fact, your customers can take their own readings just as accurately as you can.

Take this handy little instrument round in your pocket. You can use it dozens of times a day to get additional orders for lighting equipment.

WESTON
"Standard the World over"
PIONEERS SINCE 1888

Advertisement of the Weston Electrical Instrument Co., Ltd., Kingston By-pass, Surbiton, Surrey. Elmbridge 6400



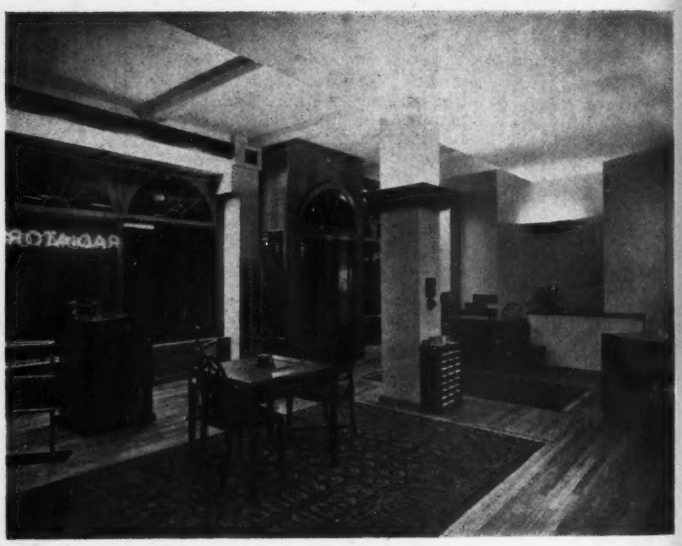
B1

Lighting that says "Comfort"

The lighting in Messrs. Crane's new showrooms in Wigmore Street, W.1, goes beyond illumination. It creates an atmosphere of comfort, and extends a cordial invitation to enter.

The whole building is suffused with light, and the visitor is enabled to consider and compare the various exhibits without eye fatigue.

You will find much to interest you in these spacious and well-planned showrooms, and when visiting them perhaps you will pause for a moment to examine the lighting — planned and installed by:



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Cause and Effect

THE CAUSE

Benjamin Glassteel Diffusers are installed throughout the new factory extensions of Messrs. Allinson & Company, the well-known Boot and Shoe Manufacturers, of Earl St. and Clare St., Northampton.

The effect of this BENJAMIN PLANNED installation is ably described in the letter from Allinson & Company, reproduced below by their kind permission.

THE EFFECT

Messrs. Allinson & Company write as follows:

"We thought possibly you would be interested to know how very delighted we are with the Benjamin Lighting which was recently installed by the Northampton Electric Light Co., in our new factory extensions.

"Our grade of work demands a very high standard of accuracy, and we find the increased efficiency of your light an invaluable asset."

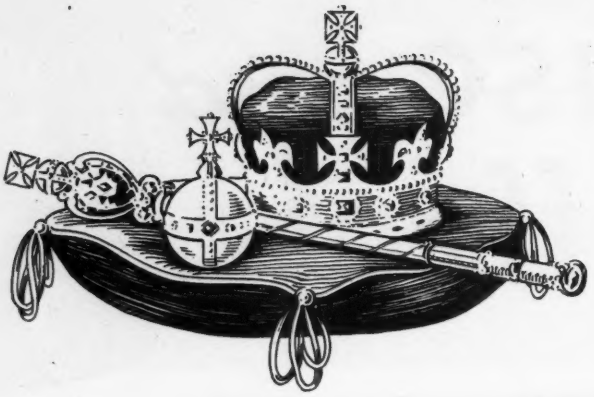
(Signed) Allinson & Company.

BENJAMIN PLANNED LIGHTING

is Hygienic and Economical

THE BENJAMIN ELECTRIC LTD., BRANTWOOD WORKS, TOTTENHAM, N.17

B2



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Incorporating "The Illuminating Engineer."

Light and Lighting

Official Journal of the Illuminating Engineering Society.

32, Victoria St. London, S.W.1

Edited by J. STEWART DOW

Telephone: Victoria 5215

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Principal Contents:

Statutory Requirement of Adequate Lighting in Factories——————At Last!

IN *The Illuminating Engineer* for July, 1934, it was recalled that:—

> Silvanus Thompson, in his inaugural address as first President of the Illuminating Engineering Society, commended "little Holland" for having already framed legislation on factory lighting —25 years ago.
>
> A Departmental Committee on Accidents in Factories and Workshops urged that requirements of adequate lighting should be included in the British Factory Acts—24 years ago.
>
> The subsequently established Departmental Committee on Lighting in Factories and Workshops repeated this recommendation—20 years ago.

Nearly two more years have since elapsed.

Now a new Bill, bringing the provisions of the Factory Acts up to date, is before Parliament. *It includes proposals for securing in every factory sufficient and suitable lighting.*

We gather that only a broad general requirement is included, but that power will be granted to make supplementary recommendations from time to time. Possibly the Departmental Committee interested in this matter may be revived.

Good Enough. As we write the Bill has passed its second reading. It does look as though we shall get the requirement at last. The Bill is intended to come into force on July 1st, 1938.

I.E.S. Special Sections—Lighting London's Parks—"Built-in Photometers"—Lighting at the Paris Exhibition—Domestic Lighting on the Wireless—The Need of Artificial Daylight—Second Industrial Physics Conference—Lighting at the Empire Exhibition, Johannesburg—Light Rays aid Gramophone Reproduction—"Science and Building" Exhibition.

I.E.S. Special Sections

As recorded elsewhere (See p. 67) the newly formed I.E.S. Industrial Lighting Section held its opening meeting at Watson House on February 9, where the hospitality of the Gas Light and Coke Company was much appreciated. At its next meeting on March 24, which will be held at Magnet House, the General Electric Co. Ltd. will act as hosts and an entertaining series of contributions featuring special problems in industrial lighting may be expected. The visit of the Photometric Section to the G.E.C. Research Laboratories at Wembley on February 22 was likewise an agreeable event, on which we shall have more to say in our next issue. We hear that good progress is being made towards the formation of a third section—that dealing with public service lighting—which, however, will probably not commence meetings until the autumn. Certainly the number of events initiated by the Society is growing! We do not think, however, that members as a whole will feel any obligation to attend all of them, for the various sections are being arranged to cover quite different fields of work. In some cases, at least, they will only achieve their full purpose when they have reached the stage of attracting audiences drawn largely from outside the Society's ranks.

Lighting London's Parks

In one of the enterprising series of articles on lighting that have recently been appearing in the "Evening Standard," it is stated that the Office of Works are considering some additional lighting in Hyde Park and Regent's Park. It is urged that the routes in most of London's parks are greatly underlighted in comparison with those carrying similar traffic outside. Apart from this, much more might be done to show off the lakes, flowers and foliage and to add to the amenities by night. Hyde Park, London, should be at least as well lighted as Hyde Park, Sydney, which has long been brightly illuminated every evening and forms one of the main attractions in the city. The author quotes Mr. Justus Eck and Mr. Percy Good, two members of the Society who took a great interest in the floodlighting in London during the 1931 Congress. Readers will remember the crowds that flocked to London on that occasion, and will also recollect that, during the Silver Jubilee celebrations in 1935, it was actually found necessary to curtail the lighting of certain buildings owing to the masses of people who assembled. It is certainly worth consideration whether the lighting of parks and open spaces during the coming celebrations would serve to attract crowds that might otherwise prove inconvenient elsewhere.

"Built-in Photometers"

In another article in the series quoted above, the ingenious suggestion is made that, in future, photometers of the direct reading type may be permanently attached or built into walls of interiors, so that occupants may see at any moment how they stand in regard to illumination. Barometers, it is urged, still form familiar objects in the hall, and thermometers are quite commonly used to record the temperature in schools and public buildings. Why not photometers to record the light? Why not, indeed? Two objections might, perhaps, be raised—that even to-day a photometer is expensive in comparison with a thermometer and that in most interiors the best use is hardly made of the instrument if it occupies a fixed position on the walls, especially in the case of artificial lighting, which varies so little from day to day. But we are all for popularising the use of means of measuring light. The new direct reading type is already proving a useful aid in large factories where the illumination in rooms lighted by similar methods can be compared and the need for maintenance in any department promptly recognised.

Forthcoming Events

March 9th. Dr. S. English on **"Some Aspects of the Street Lighting Problem"** and Mr. R. Maxted on **"The Representation of Lantern Characteristics"** *(General Meeting of the Illuminating Engineering Society in the Lecture Theatre of the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1)*; **6.30 p.m.**

March 16th. Annual Dinner of the Illuminating Engineering Society *(at the Trocadero Restaurant, Piccadilly, London, W.1)*; **6.45 p.m.** for **7.30 p.m.**

March 24th. Discussion on **Problems in Industrial Lighting** *(Meeting of the Industrial Lighting Section of the Illuminating Engineering Society at Magnet House, Kingsway, London)*; **6.30 p.m.**

April 6th. Visit to the **Kodak Research Laboratory, Wealdstone**, where a paper reviewing certain applications of photometry in relation to photographic processes is in prospect *(Arranged by the Photometry Section of the Illuminating Engineering Society)*; **6 p.m.**

Lighting at the Paris (1937) International Exhibition

We learn from l'Association des Ingénieurs de l'Eclairage that an International Congress devoted to Lighting Applications will be associated with the 1937 International Exposition, to take place in Paris between June 24 and July 1.

Reports and papers dealing with the following subjects will be presented: Sources of Light, Fittings, Street and Road Lighting, Lighting in connection with Festivals and Exhibitions, Lighting in Medicine and Surgery, Industrial Lighting (special applications), Natural Lighting, Decorative Lighting of Interiors, and Outdoor Decorative Lighting.

Anyone who desires to participate in the congress should apply to the Organisation of the International Congress of Lighting Applications (Paris 1937), 12, Place de Laborde, Paris 8° (France).

Domestic Lighting on the Wireless

We hear that, on January 21, Mr. J. B. Harris, one of the younger members of the Illuminating Engineer-Society, broadcast (National Programme) a short talk on domestic lighting. Mr. Harris gave some general hints on fundamental points in good lighting, such as the elimination of glare and dazzle, and discussed in turn the lighting of the kitchen, dining room, drawing room, bedroom, and bathroom. One was glad to note the emphasis placed on diffused lighting in the kitchen, on lamps both over the dressing table and at the bedside in the bedroom. One was also pleased to observe the final good advice given to a suburban resident—to install above the door a 40-watt lamp in an opal glass cube, on which the number of the house should be painted—a device which should not cost more than five shillings a year and may spare a visitor much trouble in locating a house in an unfamiliar neighbourhood.

The Need of Artificial Daylight and the Cost of "Doing Without"

In the course of a paper on artificial daylight filters which appears in the Transactions of the Illuminating Engineering Society (U.S.A.) for December, 1936, H. P. Gage and Norman Macbeth gave some instructive instances of loss occasion by colour mistakes:—

(1) A sheet-metal printer lost the time and material for more than 780,000 talcum cans on which the colour came out wrong, because the work was done by ordinary artificial light.

(2) A lithographer was refused acceptance of a million calendars with a trade mark design, because the colour, which appeared similar to that in the approved copy by daylight, proved to be quite different and unsatisfactory in artificial light.

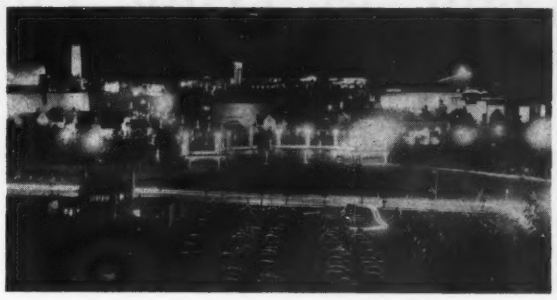
(3) A hat manufacturer was unable to use 1,800 dozen hatbands dyed to match his hats, which, though an acceptable match in daylight, were in violent contrast under artificial light.

"Science and Building" Exhibition

This exhibition, which is being held at the Building Centre (158, New Bond-street, London, W.1.) during the period March 1-25, is intended to illustrate the work being carried out by the various organisations controlled by or associated with the Department of Scientific and Industrial Research.

It is very wide in its scope, and besides dealing with many materials and processes utilised in building will contain interesting contributions by the National Physical Laboratory on illumination in buildings, acoustics, wind pressures, etc.

Lighting at the Empire Exhibition, Johannesburg



We have received from our correspondent in South Africa the above photograph, illustrating the appearance by night of the Empire Exhibition, Johannesburg, recently described in *Light and Lighting* (January, 1937, pp. 8-10). The photograph was taken from a site facing the main entrance and gives quite a good idea of the general effect.

Light-Rays Aid Gramophone Reproduction

Our correspondent also informs us that a Johannesburg man, Mr. Noel Johnson, has invented a device that may revolutionise gramophone reproduction. The device, which consists of a new "pick-up" in place of the present type found on gramophone tone-arms, utilises light rays for the transmission of the impulses set up by the record. In place of a diaphram operating off a steel needle leaning heavily in the grooves of the record, a fibre needle carries a minute steel mirror. On the mirror is focussed a light from a tiny bulb and lens hanging above it. The mirror vibrates as the needle runs along the groove, throwing an oscillating beam of light on to a prism, which splits the beam and directs it through two photo-electric cells. As more light hits one side of the prism a proportionately smaller beam hits the other side. The photo-electric cells, therefore, exercise a push-and pull effect. The light beam registers the most minute movement of the needle so that all the subtleties of the record are faithfully produced. It is stated that the new method can be also used effectively to record rapid vibrations dealing with the performance of motors or seismographs, a light beam as a source of transmission of impulses having a flexibility previously unknown.

Second Industrial Physics Conference

Optical Devices in Research and Industry

The above conference will be held in the University of Birmingham during March 18-20.

The presidential address, by Professor A. Fowler, will deal with "Spectroscopy in Industry," and there will be lectures and discussions on such topics as colorimetry, spectrophotometry, and the inspection of manufactured products for "appearance"; the Application of Electron Diffraction to Industrial Problems; Industrial Uses of Photocells; Optical Gauges for Metrology and Engineering; Polarimeters, Saccharimeters, and Refractometers in sugar, jam-boiling, and other industries.

There will be a conference dinner, and visits to local works and research laboratories have been arranged.

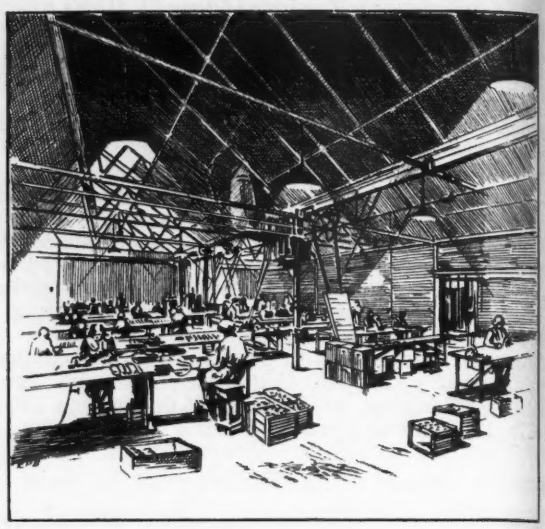
Further particulars may be obtained from the conference secretary, at the Institute of Physics, 1, Lowther-gardens, Exhibition-road, London, S.W.1.

Light in Daily Life

(V) Light and Work

Construction Work by Night—The Lighting of Mines — Lighting and Safety — Maintenance—Eyestrain and Fatigue—Lighting and Production —Control of Industrial Operations by Light—Automatic Control of Lighting.

(*Continued from p. 37, February, 1937.*)



Construction Work by Night.

There are some forms of work for which the flexibility of modern systems of lighting is a great asset—operations such that time is of great moment and when it is vital to get the contract completed by a specified date. Many forms of civil engineering—the construction of dams, canals, bridges, etc.—which involve long sustained hand labour, fall into this class. Other work of similar character includes the erection of buildings and (as is exemplified by the preparations for the coming Coronation festivities) the putting up of stands, surface work on railways and (as the new extension programme of the London tube railways necessitates) tunnelling underground.

In the case of most operations of this type the work is relatively simple and the degree of illumination needed is not very great. The essential thing is that work which takes so long to do should proceed continuously. When gas or electricity is available local arrangements for strong lighting may be made on the spot, but in other cases there are now available convenient self-contained and portable systems, using acetylene or incandescent mantles operated by paraffin, which give a powerful light and are weatherproof. A newcomer in this field which seems likely to prove useful is "calor gas," a portable product which affords a local substitute for regular gas supply.

When work is confined to a relatively small area local lights may be brought close to the operations, in other cases, where large areas are involved, projectors mounted on high posts and giving an effect resembling that of floodlighting may be used. For dockyards and railway yards such systems have been highly developed. They have also been used with good effect to facilitate supervision, e.g., outside prisons, arsenals, fortifications and important Government works. The flooding of an area with light ensures that no unauthorised person can approach without being seen.

The Lighting of Mines.

The case of the miner has often been quoted as that of the worker who suffers, almost more than any other, in regard to insufficiency of light. His work underground is carried out for long periods exclusively by artificial light. It is always strenuous, frequently dangerous and much of it of a highly skilled nature. Yet the amount of light he receives is often minute in comparison with that afforded other industries.

The case of the worker in most metal mines is not quite so bad because electricity can be led underground. Methods successfully adopted in factories can usually be in some degree reproduced. Faces from which the ore is extracted may be floodlighted and reasonable illumination provided in galleries and on haulage ways. As a rule such mines are "safe" in the sense that danger from explosions of gas-laden atmospheres need not be feared.

In many coal mines the position is much more difficult. Owing to possible danger from the ignition of explosive gases safety hand lamps may be exclusively used in many regions. Even to-day the leading of electric mains into such areas is regarded with apprehension. Apart from this possible danger it would often be by no means easy to carry such systems into the confined places where work is done, and it must also be remembered that the area of operations is continually changing, so that the light has to go with the miner as he moves on and changes position.

During recent years much attention has been devoted to the possibility of "mains lighting" and the floodlighting of faces in collieries. Experience can be quoted to show that in relatively safe areas and where the seam is large this system is associated with higher output, better quality of work and greater freedom from accidents. Nevertheless in many collieries portable hand lamps may continue to be the main source of illumination for some time to come.

The very weak illumination yielded by such lamps is, however, a great drawback, and the dark surroundings of the miner accentuate the abnormal conditions under which he works. The actual illumination at the coal-face may well be less than one-tenth

of a foot-candle, and of this light certainly less than one-tenth is reflected, the remainder being absorbed by the dark surface. The dim conditions under which the eye has to work for such long periods are believed to be the chief cause of the oscillation of the eyes known as "miner's nystagmus," which involves compensation payments of many thousands of pounds annually. The need for higher illuminations is urgent. Considerable improvement in miners' lamps has been made during recent years, but a very substantial increase in candlepower is hardly possible without a corresponding increase in the storage capacity of the battery, and hence, undue increase in weight. There is every reason, therefore, to recommend the adoption of mains lighting wherever this is practicable, and also the use of such devices as whitewashing and stone-dusting the coal-face, which increase very greatly the effective value of such light as can be furnished.

Lighting and Safety.

Although in mines the question of danger assumes an acute form, risk is present in some degree in all forms of industrial work, and quite a substantial proportion of accidents are associated with imperfections in lighting. Insufficient light may result in some obstacle not being seen, and may thus cause a worker to stumble, distorting shadows may cause a worker on scaffolding to lose his footing, or a factory hand to mistake the exact position of a cutting edge. In trades that involve the handling of dangerous or poisonous material, good lighting, essential in the interests of cleanliness, has been made the subject of special provision.

A broad indication of the effect of light on the prevalence of accidents is afforded by the monthly records throughout the year. Such charts show that the accident rate follows the waxing and waning of daylight, being greatest in the dark winter months, and least in the summer when daylight is at its maximum. Such records inevitably contain many forms of accident unconnected with lighting, and this rather tends to mask the effect. If, however, one considers only a form of accident particularly liable to be caused by inadequate lighting—such as those due to "persons falling"—the variation with the time of year is seen to be very marked indeed.

Apart from its being our obvious duty, in the interests of humanity, to check the annual death-roll in industry in every possible way, the matter has its economic side. A bad accident in a factory influences the minds of operators and disturbs the routine for weeks afterwards. An instinctive feeling of apprehension on the part of workers tends to slow down the pace of action. Ample lighting, on the other hand, by creating confidence, enables the worker to put forth his best efforts. It may often happen, too, that the compensation payable for an accident is only a small part of the total loss involved (such as breach of contract or damage to goodwill owing to inability to deliver goods to time), and that the indirect and uninsurable losses are more serious than the direct ones.

It is also well not to lose sight of the influence of lighting on the performance of machinery. In a poorly lighted factory plant is rarely kept clean. Dirt, it has well been said, is one of the worst diseases that plant can suffer from, paving the way for the inevitable breakdown, which may have serious economic consequences.

Maintenance.

A difficulty familiar to lighting experts is that the original installation so quickly becomes impaired, not only through the ageing of lamps or mantles, but still more owing to the blockage of light through deposits of grime on reflectors and glassware. The effect of such deposits in diminishing light transmitted through glass may be very serious indeed. This, however, does not conclude the possible sources of loss. In most modern lighting installations considerable use is made of reflection of light from walls and ceilings, which are, in effect, part of the lighting equipment. If these are allowed to become discoloured with dirt, lighting is again impaired.

It is customary, in dealing with industrial lighting installations, to assume that the original illumination may in course of time be reduced by 30 per cent. In order to compensate for this the original estimated illumination needs to be multiplied by a depreciation factor of 1.4, and the consumption increased accordingly.

But it is safe to say that under really bad conditions the loss of light in some industrial installations is even worse. Manufacturers of lighting equipment are familiar with the need for special design when fittings have to withstand atmospheres impregnated with moisture of chemical fumes. Modern all-enclosed fittings are less liable to the effects of dust than some of the older open forms. But no forethought in design can guard against the continuous deposit of greasy dirt on fittings and their surroundings, if never cleaned. It is probable that in some cases—collieries and steel plants are examples—deterioration is so rapid that the management have no real faith either in maintenance or expert design. Home-made fittings that are merely screens stamped out of sheet iron are not unusual.

In reality, however, a systematic survey would show that even under the most disheartening conditions regular cleaning and maintenance is economically worth while. In modern factories, with new and up-to-date lighting, managers usually take some pride in their equipment, and systematic maintenance is not unusual. The new and handy light-meters, based on the use of light-sensitive cells, on which illumination is recorded by the movement of a pointer on a dial, are a help in this respect. Such instruments, if limited as regards accuracy, can at least be read by everyone. It is easy, therefore, to

check when the lighting of some department is below par and to demonstrate the effect of thorough cleaning in bringing it up to the mark.

Eyestrain and Fatigue.

That really unsatisfactory lighting *must* react unfavourably both on eyesight and physique can scarcely be doubted, though, admittedly, it is very difficult to present detailed statistics in support of this belief. It is only comparatively recently that the effect on health of comparatively slight visual defects—the headaches, for instance, associated with uncorrected myopia or difficulties of convergence—have become generally appreciated. It is, therefore, easy to understand how the effects of consistent effort to see by unsuitable lighting may be experienced without their cause being realised. Insufficient light is doubtless common enough. But it is probable that mistakes in regard to the position and arrangement of lights are still more frequently responsible for "difficulty in seeing." The distressing effect of bright sources of light in the direct range of vision—a natural cause of headache—is now better understood. But the constant irritation and fatigue caused by "reflected glare" is less frequently appreciated. Even a small degree of reflection of light from glossy paper, slightly affecting ease in reading, may have a bad cumulative effect during the day's work.

Lighting and Production.

A guide to quality of lighting that is more readily applied is a practical one—its effect on output and quality of work. It has been shown definitely, by researches conducted for the Department of Scientific and Industrial Research, that both are affected by the conditions of lighting—though naturally the effect depends on the character of the process studied.

One point to be remembered is that few industrial processes involve continuous visual work. In almost all cases part of the task is executed mechanically—it could, as the saying goes, "be done with the eyes shut." The percentage of the total time occupied in visual effort is often surprisingly small. Better lighting can only be expected to improve a small part of the process. The total percentage gain, therefore, may not be great.

It is naturally in the case of trades imposing the greatest and most continuous effort of the eyes that the effect is most evident. The researches mentioned above were therefore directed, firstly, to the process of type-setting by hand. Long continued experiments showed that full efficiency (both as regards speed and accuracy) was only reached with illuminations of the same order as those often furnished by daylight indoors, i.e., about 20-25 foot-candles. Equally interesting was the recognition during the researches of a low limit—a figure in the neighbourhood of 1 foot-candle—at which the workers definitely "struck."!

The same method of exploration has been applied to other trades, such as the relatively simple process of tile-pressing by hand. It is rather remarkable that even in this almost purely mechanical operation evidence of better performance with increasing illumination was obtained. In this and similar cases, however, the psychological effect of brighter lighting which, apart from any visual gain, tends to produce a more cheerful and energetic frame of mind should not be overlooked.

Important series of researches are now proceeding with a view to studying separately the effect of higher illuminations on individual factors, such as size of object viewed, contrast, speed of perception, etc. These experiments have already led to striking results. They have confirmed, for example, that when the eye is engaged in the inspection of relatively minute objects, one can go up to quite high illuminations (hundreds of foot-candles) and still find improvement in the ease of perception.

The inference should not be drawn that such exceedingly high illuminations are necessary for daily simple tasks, but that they may prove useful in the case of exceptionally severe work.

It should also not be assumed, without inquiry, that it is economically expedient to increase the illumination to a figure beyond which no gain in output is secured. Commercial advantage and scientific perfection do not always coincide. A manufacturer will naturally wish to compare the value (to him) of the improvement in production with the cost of the higher illumination responsible.

Control of Industrial Operations by Light.

An interesting development in industry during recent years has been the control of industrial operations by the aid of light-sensitive cells, operated by a ray of light. A familiar application of the process is to be seen on the Underground Railways, where the arrival of the train interrupts a beam of light which crosses the rail and impinges on a photo-electric cell, in so doing turning on the special lamps illuminating the space between train and platform. The same device has been applied to processes involving the counting of passing objects, for checking the numbers of newspapers or leaves delivered from a printing machine, and for controlling other processes in the printing and paper-making industries. Yet another useful application is for the prevention of excessive smoke from chimneys—a warning being at once given when the density of the smoke traversed by a beam of light, which falls on the light sensitive cell, exceeds a certain value.

Automatic Control of Lighting.

A natural development of the same process is for the control of artificial lighting in an office or factory, so that it can be automatically switched on when daylight has fallen to a prescribed value, i.e., when the "grumble point" is reached. The setting of this value may have to be found by trial and error, as the judgment of persons is apt to be affected in some degree by local circumstances, such as the positions of windows in relation to desks, the nature of the wall surface, etc. Too great exactitude in the operation of the system at a given illumination should not be expected. Nevertheless, the device is capable of useful applications, particularly when lamps yielding light visually resembling daylight are used, so that the lighting up of them to supplement fading daylight is effected without the user being conscious of any marked change.

I.E.S. Industrial Lighting Section

Opening Meeting at Watson House, on February 9th

There was a good send-off for the newly formed Industrial Section of the Illuminating Engineering Society at its opening meeting on February 9.

At the invitation of the Gas Light and Coke Company, who provided a coach to convey the party from Walham Green station, about eighty members and visitors assembled at Watson House.

On arrival they were taken in parties on a rapid tour of the laboratories, and were much interested in observing the very considerable amount of research work in progress and the main features of the new building. Although it was stated that the actual floor area in this new building is not very much more than in the old premises, one certainly got the impression of greater space—chiefly, no doubt, because the available area is now used to better advantage.

Inspection of Laboratories.

Members were naturally interested in the researches bearing on illumination, and spent some time in the photometric laboratory studying the working of the special equipment for getting out polar curves and the ingenious model by means of which isocandle diagrams can be demonstrated and explained. In a broad sense, however, many of the experiments on combustion, ventilation, and radiation were quite as interesting. One was struck by one feature of the work of Watson House, which, we believe, has no exact parallel in the electrical industry—the manner in which special appliances are designed and tested out and are then handed over to firms to exploit by licence on very moderate terms. There was one heating appliance of which some hundreds of thousands have been put into operation on this basis—the initial design being entirely due to Watson House, but the commercial development entrusted to various firms.

In the course of the tour one was struck by the broadminded and enterprising readiness shown to make use of electrical appliances in any case in which they were useful. Much of the lighting is also electric, though conspicuous examples of what gas lighting can do were provided in certain workshops and demonstration rooms. From the standpoint of avoidance of glare the workshop lighting should serve as a model. Not a single mantle could be seen as one gazed across the room, all sources being adequately screened, and the illumination seemed ample. In the demonstration a good instance of concealed lighting, with gas lamps mounted above laylights on the ceiling, was provided.

After the party had reassembled for light refreshments the meeting of the section took place in the new lecture theatre. Mr. C. A. Masterman spoke a few words of welcome. The President (Mr. A. Cunnington), in expressing thanks for the hospitality of the Gas Light and Coke Company, expressed the appreciation by the Society of the great

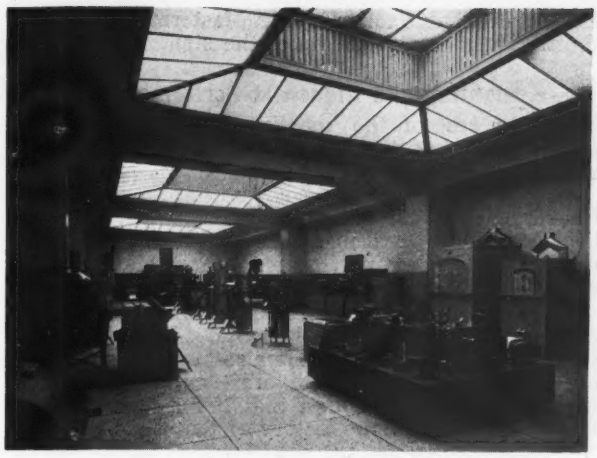


Fig. 1. An Industrial Showroom at Watson House. The illumination is furnished by gas lamps mounted above the artificial daylight of diffusing glass, and an illumination of 15 foot-candles is available over the larger part of the floor area.

Fig. 2. One of the Industrial Workshops at Watson House where an average illumination on benches of 12 foot-candles (max. 17 ft.-c.; min. 10 ft.-c.) is provided. Attention may be drawn to the absence of shadows under benches, providing ready access to materials stored, and to the absence of glare —all mantles being completely screened from the eyes of anyone looking across the room.

Fig. 3. Another Industrial Workshops at Watson House where the conditions indicated under Fig. 2 again prevail.

amount of trouble taken by Mr. Masterman, Mr. F. C. Smith, and other members of the staff.

Lighting and Industrial Performance.

For the rest of the meeting Mr. R. O. Ackerly, the chairman of the organising committee of the section, presided.

Mr. H. C. Weston, who is familiar to readers of this journal for his unique research work for the Department of Scientific and Industrial Research and the Industrial Health Research Board, then gave an address on "Lighting and Industrial Performance."

In his opening remarks Mr. Weston emphasised how greatly "the human element" is linked up with performance in industry. He also made the interesting statement that the old craft guilds prohibited night work on the ground that it led to bad work. With the coming of the factory system this limitation was forgotten. To-day the need for good factory lighting is widely admitted, though our knowledge of the effect of differing conditions on performance is still far from complete.

The difficulty in getting conclusive results in regard to the effect of lighting on performance is very great. There is, unfortunately, no way of assessing the effect of lighting conditions on visual comfort as compared with capacity and performance—though conceivably the distance at which the eyes are kept from the work might serve as an index if it could be measured with precision. The number of variables, other than lighting, must also be considered. One great advantage, in the investigation of typesetting, was that more effective control could be exercised than is usually possible in factories.

Difficult and Simple Processes.

Mr. Weston recalled the results of this investigation, which had shown that normal daylight output and accuracy was obtained with an illumination of about 24 foot-candles. A recent investigation of weaving has shown increases in performance up to 30-40 foot-candles. Some studies in Germany have suggested still higher values, but the value of special directional lighting was also emphasised. In this country comparisons of performance of weavers by natural and artificial light have also led to broad conclusions in regard to the influence of better lighting on work. Similar experience has been reported in connection with processes involving the inspection of cartridge cases—though here certain defects of artificial lighting, such as lack of uniformity of illumination and troublesome reflection from polished brass caps, evidently influenced the result.

Recent researches in works devoted to tile pressing were also quoted. This case is instructive because the work is of a very simple character. The fact that, even here, higher illuminations led to improvement of output, gives support for the belief that, apart from its influence in making the visual task easier, such illuminations have a certain psychological effect. They create a more cheerful and energetic frame of mind which may be reflected in the work. Other operations, involving the examination of minute objects by young girls, specially selected and trained whilst their eyes are still adaptable, were mentioned as representing the other extreme. Here the effect of lighting conditions on the visual task may be very great, but other factors—such as the provision of magnifying glasses ensuring that the parts can be seen with ease—may be equally important.

Effect of Size of Object.

Mr. Weston discussed in detail the very valuable fundamental work that he has done for the Department of Scientific and Industrial Research, some of which has already been published in the "pink" reports of that body. The investigation into the relation between size of object and the effect of illumination on speed of work, has been particularly impressive. The sets of curves show how very important this question of size may be. With relatively large objects, easily seen, the gain in passing beyond quite moderate illumination is trifling. But when we come to objects of a size that really does impose effort on the eye, the effect is very striking indeed—one finds that after illuminations of the order of several hundred foot-candles have been attained, improvements in output and accuracy may still be recorded.

One very important consideration must, however, be kept in view in judging all industrial tasks. With a full knowledge of the effect of various factors, size of objects, contrast, etc., one may be able to assess the general effect of higher illuminations in the case of any given visual industrial process. But the percentage of the total time occupied by the purely visual task may be small, i.e., the greater part of the worker's time may be occupied with purely manual or automatic actions on which changes in lighting conditions have little effect. This explains, in some degree why, in the case of many processes, the effect of higher illuminations on output may in practice prove to be relatively small.

Local Lighting necessary.

Mr. Weston pointed out that, even assuming that these exceptionally high illuminations could be proved to be beneficial in improving the performance of difficult visual tasks, it was still a matter for consideration whether they are economically justified. To provide for such illuminations by means of a system of general lighting, even if possible without undue cost and discomfort in the form of heat, might defeat the object by making the general brightness greater than that of the work itself. Intense local lighting, supplemented by moderate general illumination, would therefore be preferable.

In conclusion the lecturer recalled the great strides that has been made in improving the efficiency of sources of light since the Society was founded twenty-eight years ago, and the much better lighting of factories, for the same cost, now possible. One could certainly look forward to further progress in the future.

In the discussion, in which Mr. T. C. Angus, Mr. J. S. Preston, Mr. F. C. Smith, Mr. A. Cunnington, Mr. J. S. Dow, Mr. E. Stroud, and others, took part, such problems as the comparison of conditions by daylight and artificial light, the effect of colour and quality of lighting, as compared with intensity, and the psychological effect of higher illuminations were mentioned.

Future Programme.

After Mr. Weston had briefly replied and had been accorded a very hearty vote of thanks for his address, the Chairman invited suggestions from those present in regard to the running of the section. Several useful suggestions in regard to the arrangement of visits, the selection of special problems for study, and the various outside bodies likely to be interested in the work of the section, were made. It was announced that the next meeting, on March 24, would be devoted to a Problems Night, and would be held by the invitation of the General Electric Co. Ltd., at Magnet House, whilst on April 21, when several papers on the design of industrial lighting fittings were expected, the meeting would be held at the E.L.M.A. Lighting Service Bureau.

The Chairman expressed his satisfaction at the good response that had followed the invitation to join this newly-formed special section. He emphasised the fact that those interested as consumers and users of light in industry were specially welcome as visitors, and the hope that ultimately some of them would see their way to join the Society and assist in the good work it was doing.

The Opening of Gas Industry House

Fig. 1. An Exterior View of Gas Industry House.

The new Gas Industry House at No. 1 Grosvenor Place, London, formerly the Wellington Club, was officially opened by Mr. Walter Runciman, President of the Board of Trade, on February 19th. After the Opening Ceremony there was a luncheon at the Dorchester Hotel, over which Sir David Milne Watson presided, at the conclusion of which Mr. Runciman was presented with a silver bowl as a memento of the occasion. This imposing new building has eight floors and 80 offices and rooms and employs a staff of 150. It utilises in all 150 Gas-fires. The gas lighting of many of the rooms also presents features of interest.

Gas Industry House, which was officially opened by the President of the Board of Trade on February 19, serves as the headquarters of the gas industry. Within it five important bodies are housed: The Institution of Gas Engineers, the British Commercial Gas Association, the National Gas Council, the Women's Gas Council, and the British Gas Federation.

Members of the National Illumination Committee and others who have already enjoyed the hospitality of Gas Industry House for meetings will be generally familiar with its leading features. Many of the rooms are of imposing dimensions. Adjacent to the main entrance hall (Fig. 2)' there is the reception area where display windows illustrate the possibilities of gas (Fig. 3). Below the ground floor there were originally vast underground cellars of considerable extent, which have now been modernised and turned to good account for a staff restaurant, stores, and so forth.

The first floor is occupied largely by the Board Room, capable of accommodating about a hundred people, and a series of interconnecting committee rooms, some of which are illustrated in Fig. 4.

The Board Room is equipped with microphones and loud-speakers, which can, if necessary, be connected up to each of the three adjacent committee rooms, so that anything spoken in one room can be relayed to the others. The walls and ceilings of these rooms have been specially treated to improve the acoustics.

The gas lighting of the Board Room and committee

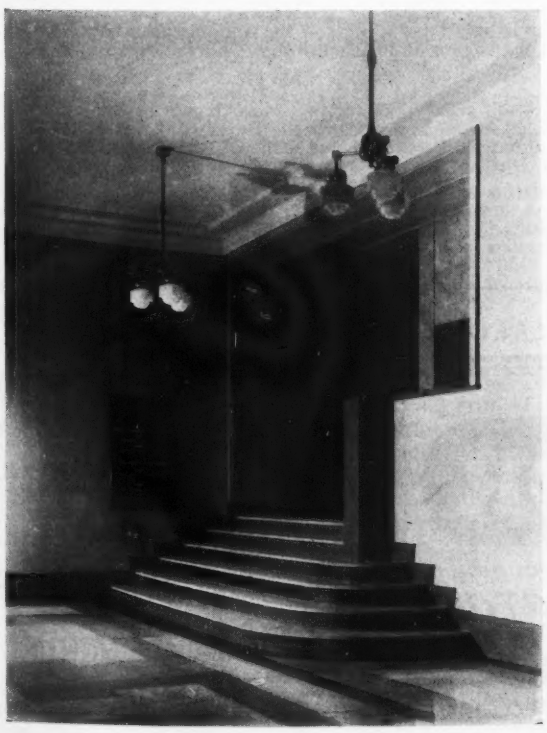


Fig. 2. A View of the Entrance Hall, showing way up to lifts.

Fig. 3. The Reception Hall, showing the two Display Windows.

rooms, and indeed throughout the building, is of the most modern character. It is controlled from switches by the door in the same manner as electric lighting, and many of the fittings are in appearance almost indistinguishable from electric lighting fittings of the latest "architectural" type. This applies particularly to the pendant fittings in the Board Room and committee rooms, one of which is visible in the background in Fig. 4. The lighting effect, which may be described as semi-indirect, is excellent, and the appearance of the fittings is reminiscent of those used in the new R.I.B.A. building—a condition that may perhaps be associated with the fact that Mr. G. Grey Wornum was responsible for the interior decorations. Generally speaking light and easily cleaned surfaces predominate, and this should materially help in preserving the good initial lighting conditions.

There are many details in the equipment of rooms of considerable general interest. Office furniture and other equipment is mainly of steel, and the same material is in general used for interior partitions of rooms. Rooms are fitted with electric clocks and direct reading thermometers.

Fig. 4. A View showing Nos. 2, 3 and 4 of the four interconnecting Committee Rooms, with the Library doors beyond.

Notes on Street Lighting with Gas

Westminster City Council has accepted an offer from the Gas Light and Coke Company to increase the illumination in Parliament-square for a period of four weeks round the date of the Coronation. Each of the twelve lamps is at present of 1,800 candle power, and each will be fitted with a triple arm carrying two 2,000 and one 3,000 candle power lamps.

Denton Urban District Council have arranged for improvements in the public lighting under their control. The Gas Department has recently fixed thirty-four twelve-mantle lamps, spaced in staggered formation at intervals of forty yards, in one of the main streets, and is now putting in a similar system of twenty-three lamps in another road. Denton is almost entirely gas-lighted.

A recent contract for public lighting by gas affects Smalley and is a seven-year agreement. Here and in neighbouring Derbyshire parishes considerable efforts are being made to improve the street lighting. The Heanor U.D.C., for instance, have arranged for the installation of a number of modern gas lamps in place of the existing ones, and long-term contracts for gas have been made for several villages not previously lighted.

The Kirkby-in-Ashfield Urban District Council have renewed their contracts for gas lighting in the streets under their control. About 326 lamps, all of which are clock controlled, are affected by the agreement.

Of forty-four miles of lighted streets in Falkirk, thirty-three are lighted by the Falkirk Gas Department. Gas lamps now total 1,133, and the annual consumption of gas is in the region of 15,600,000 cubic feet.

A ten years' plan for the improvement of the public lighting has been approved by the Hereford Town Council. It is estimated that the scheme will cost something over £6,000.

A ten-year contract for street lighting by gas has been entered into by the Godmanchester Borough Council. Various improvements in the lighting are to be carried out.

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Electric Street Lighting

In Winter Half the Number of Street Accidents Happen at Night—£25,000,000 is paid Annually in Compensation for Road Accidents—Adequate Public Lighting is a Necessity and to provide it an Obligation —Distant Objects on Roadways are seen Chiefly in Silhouette — Modern Lighting makes the best use of Shiny Road Surfaces —Positions of Light-Sources as well as their candle-power are Important—Over 30,000 Electric Discharge Lamps Now in Use on Roads in this Country.

In connection with the Electric Illumination Exhibition at the Science Museum, South Kensington, Mr. E. C. Lennox, president of the Association of Public Lighting Engineers, gave a lecture on Monday evening, February 1. The lecture was entitled "Electric Street Lighting," and some of the points brought out are well worth repeating.

Accidents in Streets.

An analysis of accident statistics on the roads show that the greatest number of accidents occur between 5 and 8 p.m. in the winter months, and between 10 and 11 p.m. during the summer—that is, when artificial lighting is most essential. It is a reasonable assumption, therefore, that many of the accidents are due to inadequate visibility. Again, during the winter 56 per cent. to 58 per cent. of all accidents occur during darkness

British insurance companies pay out £25,000,000 annually in respect to road accident claims, whilst the total annual expenditure on street lighting in this country is only one-fifth of this amount; thus, if the accident cost could be reduced by 10 per cent. and the 2½ million pounds per annum were available for street lighting, Mr. Lennox assured his audience that twice the illumination now prevailing could be provided and visibility probably increased fourfold.

Road Lighting an Obligation.

Owing to increased danger on the roads due to heavier and faster traffic, Mr. Lennox declared, adequate street lighting has now become imperative. It is time that public lighting was established on a sound footing and ceased to be a purely voluntary duty of local authorities; placing an uneven burden on the community in sparse areas for a given standard of street lighting costing a lighting rate from 2d. to 5d. in reasonably prosperous parishes, the poorer parishes might easily be mulcted with a cost as high as 10s. in the £!

Value of Contrast.

By means of slides Mr. Lennox showed that objects are seen either light against a dark background or dark against a light background, and that to produce good visibility it is essential to have good contrast; even in daylight objects more than 15 ft. distant are usually seen dark against a light background. To the public lighting engineer, therefore, it is essential that he should make the roadway appear bright, so that any object using or crossing the roadway shall appear as a silhouette.

Shiny Road Surfaces.

Nearly all materials have the property at some angles of producing semi-specular reflection, and this applies equally to road-surfacing materials. Such reflection occurs chiefly at very large angles of incidence; for example, where the beam of light is almost parallel with the road surface. It is the job of the public lighting engineer to take the utmost advantage of this fact so as to make his road appear bright or shiny, and for such brightness to be spread as evenly as possible over the whole of the road surface. The best method of lighting the road in this way is for the lighting sources to be almost at the side of the road. Lamps suspended over the centre of the highway are deprecated because a bright lane is produced near the middle of the road, leaving both sides of the road or kerbs in relative darkness. Similarly lamps on one side of the road only should be avoided if possible, except on curves, when they should be on the outside radius. Lamps mounted at a suitable height, say 25 feet, and suitably arranged to take advantage of the reflectivity of the road surface by producing maximum road brightness for the number of lamps available do not produce serious glare; thus the exposure of bright light sources is not harmful.

Great importance is now attached to visibility and the relation of road surface brightness thereto. The lecturer suggested that the British Standard Specification for Street Lighting, whilst it has served an excellent purpose, does not completely portray the merits of a street lighting installation from a visibility point of view.

Good and accepted practice in residential areas is to provide lighting units with not less than 100 watt lamps spaced forty yards apart and not less than fifteen feet high; and the interim report of the Ministry of Transport Departmental Committee on street lighting recommends that lamps on main roads should not be more than 150 feet apart and should be 25 feet above road level. Unfortunately, however, it does not specify the size of the light source desirable.

Location of Standards.

Again, on main roads individual attention must be given to the spacing of posts, particularly at curves. Light backgrounds are of immense value in producing good visibility, which can often be improved by the fixing of hoardings in suitable positions, or by painting railings, etc., which are usually dark, in some light colour.

Mr. Lennox then went on to consider lighting sources, and he showed, by a suitable diagram, how the carbon filament lamp giving three lumens per watt had given place to gas-filled lamps and to electric discharge lamps giving anything from 45 to 64 lumens per watt.

Electric Discharge Lamps.

The control of the light emitted from filament lamps is relatively easy owing to the compact shape and size of the light source, such control being easily effected by the use of mirrored reflectors or by suitably designed prismatic refractors. With the introduction of electric discharge lamps, in order to take the utmost advantage of the different shape of light source, a radical change in the design of lighting equipment was evolved, with the result that new lanterns were produced with light control characteristics pre-eminently united to street lighting application.

Over 200 lighting authorities in this country are now using well over 30,000 electric discharge lamps on their street lighting installations. There is no doubt that the low wattage electric discharge lamps which will shortly become available will revolutionise the street lighting in residential areas, since their light output is no less than three times that for filament lamps of equivalent consumption. With its increasing availability throughout the country, together with suitable administration, electricity, concluded Mr. Lennox, is destined to play a most important role in the development of better street lighting, thus helping to satisfy the public lighting engineer's ideal of safety in the use of roads at night.

Road Lighting and Road Surfaces

We learn that there was an excellent attendance at the meeting in Manchester on February 17, when Mr. G. H. Wilson's paper on "Road Lighting and Road Surfaces" was read. The meeting was arranged initially by the Institution of Civil Engineers (Manchester and District Association), but an invitation was extended to all members of the North Western Local Centre of the Illuminating Engineering Society to attend.

We propose to reserve, for a coming issue, a fuller account of this informative paper. For the moment it may be said that it contained a clear introductory statement of the conditions underlying modern conceptions of street lighting and detailed analysis of the characteristics of a variety of materials commonly used for road surface equipment. A number of effective illustrations accompanied the paper and illustrated some of the chief conclusions. From these the vital importance of the nature of the road surface, which must be considered jointly with scientific design of the lighting installation, may be inferred. On these factors depend the elimination of dangerous "pools of darkness," and the overcoming of another recognised inconvenience—the marked difference in the distribution of brightness on a road surface under wet and dry conditions.

Diffusion and Shadows

We must also reserve until next issue full comment on the interesting paper on the above subject read by Mr. Howard Long at the meeting of the Illuminating Engineering Society on February 23. Mr. Long gave a concise but informative account of the work that has been done towards defining and standardising conditions of shadow and diffusion. A pleasant feature of the discussion was the opening contribution by Dr. K. Norden, who had come over specially from Germany in order to attend the meeting. His views on the subject and his explanation of the working of the "shadow tester" were listened to with close attention.

Another feature of the meeting was the very helpful demonstrations staged by the E.L.M.A. Lighting Service Bureau, which were the subject of special reference by the President. We liked especially the ingenious device by means of which readings of illumination taken in different parts of the room were demonstrated to the audience by the movement of a pointer on a dial, which together formed a lantern slide. We understand that this new device has been perfected only quite recently at the Bureau, and that a compact form of simple lantern and direct reading photometer, specially designed for demonstrations of this nature, is now being worked out.

Electric Discharge Lamps

I.E.S. Meeting in Dublin

A meeting of the Dublin Local Centre of the Illuminating Engineering Society was held on February 18, when a joint paper on "Electric Discharge Lamps and their Application" was given by Messrs. H. B. Ruff, B.Sc., A.M.I.E.E., and R. Maxted, B.E., of the B.T.H. Co., Ltd. Mr. F. X. Algar presided.

Mr. Ruff introduced his subject by a few brief remarks on the reasons which led to investigations of the possibilities of discharge lighting. The gas-filled lamp, owing to the nature of the tungsten filament, could only be raised to a limited temperature consonant with a reasonable life with an efficiency of 15-20 l.p.w. They had practically reached the limit of its efficiency; hence they had to look in other directions.

The lecturer then showed the spectra of different gases and metallic vapours and compared the theoretical efficiency of 650 l.p.w. and an attained efficiency of 45 l.p.w. in the mercury lamp with the tungsten 15-20 l.p.w. By means of a prism the lecturer showed the spectrum of an 80-w. mercury vapour lamp and of a 70-w. sodium lamp and their effect on a colour chart. Then followed a detailed description of the various components of the discharge lamp. By a clever two-sided projector the striking of the arc was explained, and by magnification and a synchronous motor the anode and cathode were shown in detail while the lamp was lighting.

Finally, the effect of ultra-violet radiation from the mercury lamp on different fluorescent powders concluded one of the most interesting lecture-demonstrations held by the Dublin Local Centre.

Mr. Maxted, by means of a slide and a film of a model road, demonstrated the effect of properly planned street lighting.

Mr. Davidson formally proposed a vote of thanks which was seconded by Mr. Gallagher. Mr. Algar, in putting the vote to the audience, sincerely thanked the lecturers for their very informative paper and for the trouble taken to bring over so much equipment to add to the interest of the evening.

E.L.M.A. 35th Illumination Design Course

The Illumination Design Course commencing at the E.L.M.A. Lighting Service Bureau this month (March 8-11) is the thirty-fifth arranged, and is likely to prove quite as popular as in the past—probably more so by reason of the Coronation lighting which is to form the subject of a special lecture by Mr. R. O. Ackerley.

There are in all fifteen lectures, all by specialists in their respective fields, and the course will be concluded by an informal dinner, at which Mr. John C. Dalton, general manager of the County of London Electric Supply Company, will be the principal guest.

We may recall that no fee is charged for this course, which offers an excellent opportunity to younger members of the electrical industry to gain useful knowledge. We advise those interested to get in touch at once with the manager (Mr. W. J. Jones) of the Bureau, at 2, Savoy-hill, London, W.C.

Fig. 1. Here Professor Hoodlesnoop is being warmly congratulated by the President at the conclusion of his lecture.

I.E.S. Informal Social Evening

(A New Departure)

"Turning on the Dark"

and

"Lumens at Law"

The Informal Social Evening arranged at St. Ermins Hotel (Westminster), February 22, the first of its kind arranged by the Illuminating Engineering Society, was, by general consent, a great success. The number present (approx. 230) was much greater than was originally anticipated. Considering the short time available for preparing the programme (a task entrusted jointly to the president and Mr. W. J. Jones) everything passed off very smoothly.

When, after the opening period devoted to music and light refreshments, Professor Hoodlesnoop at length made his appearance the audience were in a state of keen expectation. The professor was introduced by Mr. R. O. Ackerley in a short but witty address. His lecture was an excellent bit of "scientific fooling." It is usually a mistake to attempt to reproduce afterwards in cold blood discourses of this kind, but a few of the professor's gems, which kept the audience in a condition of continuous hilarity, and which were illustrated by many ingenious and amusing experiments, may be quoted. In tracing events through the "light ages" which preceded the final return of the world to a peaceful "dark age," the professor made references to many persons and events, to the tribe of Benjamin, the kingdom of Holophanēs and the organisation—which clearly antedated the Christian era—known as B.C./G.A. He recalled the case of a person (probably a misogynist) who was "afraid to go home in the dark," and the adventures of the period into "darkest Africa." He described the ultimate operations of fleets of autogyros carrying 100-h.p. searchlight spotlights and hovering over London, and recalled the anecdote of the cockney lad who, on seeing the bright lights of Piccadilly for the first time, turned to his mother and remarked, "This is 'ell, ma."

In his demonstrations, whether describing by the aid of slides the private life of the glow worm, or explaining (with a pair of bellows puffing soot) the treatment of lighting fittings by the Southern Railway at "H_2O—LOO," or patiently attempting to "obfuscate" an incandescent mantle with the aid of a pea-shooter, the professor was equally absurd and delightful. Some of the later experiments, such as the conversion, by the aid of fluorescence excited by ultra violet light, of a chinaman into a negro, and the demonstration of darkening effects with polarised light were genuinely instructive. A translation of the lecturer's concluding chant "Beuttell, Beuttell! Elma Eda! Sugg, Sugg!" was understood to be, "Where was Moses when the light went out?"

The picture above (Fig. 1) shows Professor Hoodlesnoop being warmly congratulated by the president at the conclusion of his lecture. There can, we think, be no possible harm in now mentioning the name of the well-known member of the Society, Mr. G. H. Wilson, who played the part of the professor so successfully.

After a brief interval, during which Professor Hoodlesnoop's apparatus was cleared away, the stage was set for the next event—the performance of "Lumens at Law" (script by Dorothy Foster Jeffery, R. C. Hawkins, and W. A. Barnes) which was produced by Miss Vera Norvick. For the benefit of those who were not present it may be explained that the case involved a claim by one John Nodole, employed by Gloom and Glare Unlimited at their Dullandim Works (Dull-street, Littlelight), who had the misfortune to fall over a bucket with consequent injury. His contention throughout was that the mishap was due to inadequate lighting—though the defendants had their own interpretation of the events.

An excellent representation of a court was contrived, and matters were conducted in proper legal form. Ultimately justice triumphed, after entertaining evidence had been called on both sides. The defendants were found guilty by a jury (empanelled from the audience with the president as foreman) and sentenced to pay a fine of £500 and to study and put into practice within the next two years all the recommendations of the Society in regard to factory lighting!

Where all did so well it is perhaps invidious to select some of the actors for special mention. We think, however, that special credit should be assigned to the Hon. Seymour Kleerly, K.C. (Jules Corthesy), who as Counsel for the Plaintiff, undertook what was probably the most arduous part after (so we are told) having been ill in bed the previous day! No doubt everyone will have his own fancies in

Fig. 2. A view of the Court, with the Hon. Mr. Justice Littup in the background. On the extreme left is Miss O. Pinto Wynn (Counsel for the Defendants), whilst on the extreme right the Hon. Seymour Kleerly, K.C., is examining a witness.

appraising the other performances. The Court Usher, A. N. Oise (Mr. Ewart Wheeler) struck us as excellent. We also liked particularly the arrogant poise of Miss Adyer Warning, a factory inspector (Margerye Tyacke) which was studied by several real factory inspectors present with considerable relish, and the negligent evidence of Y. R. Mann (H. C. W. Tossell)—"I'm a plumber by trade."

The task of presenting the case for better lighting was largely in the hands of two ladies, Stillmore Light (Dora N. Noakes) and Opal Pearl (Joan B. Kennedy), both of whom exercised a strong influence over the Hon. Mr. Justice Littup (William H. Baker), who, nevertheless, worthily sustained the dignity of the court throughout the proceedings.

The thanks of the Society are due to all those who contributed to the success of the evening. In addition to the actors one must, of course, mention specially the producer, Miss Vera Norvick. A tribute should also be paid to Mr. J. W. Howell, who, like the professor's assistants at Wembley, had a great deal of work to do in connection with the preliminary arrangements.

Fig. 1. The original and effective concrete columns used in the new Fulham Road lighting scheme.

New Street Lighting in Fulham

An enterprising step on the part of the Metropolitan Borough of Fulham has been the introduction of improved methods of lighting on a number of main roads, including Fulham Road, King's Road, New King's Road, Wandsworth Bridge Road, Waterford Road, Moore Park Road, Harwood Road, Dawes Road, North End Road, Lillie Road, and Fulham Palace Road, which represent over eight miles of main traffic routes lighted by about four hundred and sixty fittings.

The system of lighting involves the use of Osira electric discharge lamps housed in di-fractor lanterns, also made by the General Electric Co., Ltd.

On all the roads, except the Fulham Palace-road, 400-watt lamps are used. In the road mentioned, however, owing to the spacing necessitated by trolleybus poles, 250-watt Osira lamps are adopted. There are roughly 310 of the lamps of the larger wattage and 150 of the smaller type in use. The general arrangement is a staggered spacing of fifty yards between the standards. This spacing is reduced considerably at the bends, and on some sections the lamps have been located on one side and on the outside of curves.

The object of modern street lighting, for which these lanterns are specially designed, is to secure high and even brightness of the roadway so that all objects on the road surface can be clearly seen in silhouette. This method is adapted to the dark and shiny surfaces of modern roads, which it is difficult to "illuminate" in the ordinary sense, but which can be made to appear uniformly bright and substantially free from "pools of darkness" by taking advantage of the reflection of the lighting units from the polished road material. In order to achieve this end, however, the position of lighting units need careful study, and it may sometimes be expedient, as in this case, to depart from uniformity of spacing.

It will be observed from the illustrations that the standards are of somewhat unusual design. They are made of reinforced concrete and combine good mechanical strength with pleasing appearance, a feature being the bend at the top which brings the lantern well over the roadway. Another point which cannot fail to strike the observer is the manner in which these light-coloured posts "stand out" when illuminated at night.

The layout of the installation follows closely the recommendations in the Interim Report of the Ministry of Transport Departmental Committee on Street Lighting, but it is stated that the standard of illumination is at least three times the value laid down in the report.

Fig. 2. Waterford Road, Fulham, illuminated by Osira lamps in G.E.C. Di-fractor reflectors.

Fig. 3. Lillie Road, Fulham, illuminated by similar methods.

LIGHTING AUTHORITIES *use*

ELECTRICITY

to light their roads in accordance with recommendations of the

INTERIM REPORT

of the Ministry of Transport Departmental Committee on street lighting.

(7) The available light should be so employed as to produce the maximum contrast between the brightness of the object to be viewed and its background, provided there is no undue glare. (Paragraph 22.)

(8) Care should be taken to ensure the adequate lighting of kerbs and footways. (Paragraph 22.)

(9) In general, a mounting height of 25 ft., with 6 ft. overhang, is desirable. (Paragraph 23.)

(10) The positioning of lamps should be studied with a view to securing the best visibility, rather than uniform spacing, but normally the distance between lamps should not exceed 150 ft. (Paragraph 24.)

TYPICAL NEW INSTALLATIONS

LAMBETH Approx. 34 miles	61-400 watt Electric Discharge Lamps 943-250 Ditto.
ASHTON UNDER LYNE Approx. 2.1 miles	95-500 watt Filament Lamps
FULHAM Approx. 8 miles	310-400 watt Electric Discharge Lamps 147-250 Ditto.
WEMBLEY Approx. 3 miles	130-250 watt Electric Discharge Lamps
BOURNEMOUTH Approx. 8 miles	400 Electric Discharge Lamps, 400 watt & 250 watt with colour modification

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New Street Lighting in Bournemouth

In Bournemouth, which has been the site of many technical conferences, including those of the Association of Public Lighting Engineers, and the Incorporated Municipal Electrical Association interesting developments in street lighting have recently taken place. In this article the lighting of a number of streets with a combination of electric filament and discharge lamps is described.

Visitors to Bournemouth—a favourite spot for conferences—and especially those interested in public lighting, cannot fail to have observed some of the leading features of its roads, on which, even to-day, pine trees figure prominently, many being of the nature of boulevards.

Anyone who revisits Bournemouth at the present moment, however, and who makes a tour of the more

Fig. 2. A View of Poole Road, Bournemouth, in which the same system of lighting is now used.

important roadways, such as Richmond Hill, Christchurch, Poole, Wimborne, and Holdenhurst roads, will find evidence of recent changes and developments in methods of street lighting. About the middle of 1935 the Bournemouth Borough Council began to interest itself in improved methods of street lighting, and, largely as a result of the efforts of the Bournemouth and Poole Electricity Supply Company, manufacturers of electric discharge lamps were invited to install trial demonstrations. These displays coincided with the I.M.E.A. Conference in 1935, and were, doubtless, studied by many of the engineers and committee members who attended on that occasion.

One point that was clearly realised was the importance, in such a town as Bournemouth, of the *quality of the light*. Colour-distortion was felt to be unwelcome.

Of the lighting schemes that were eventually submitted to the Bournemouth Borough Council, that of the Bournemouth and Poole Electricity Supply

Fig. 1. A View of Christchurch Road, Bournemouth, in which "Sieray" electric discharge lamps in combination with filament lamps in special lanterns have been installed.

Company, employing equipment by Siemens Electric Lamps and Supplies, Ltd., was accepted, the contract comprising the installation of over 400 lighting points, incorporating Sieray electric discharge lamps. To achieve the desired colour effect, the system put forward by Siemens Electric Lamps and Supplies Ltd., and now in being, consists essentially of a lantern housing a Sieray lamp and two gasfilled tungsten filament lamps, so arranged that the filament lighting blends with the emission from the discharge lamp to produce a very pleasing result.

The lighting units employed embrace both 400-watt and 250-watt discharge lamps, according to the conditions. In the greater part of the installation which calls for directionally controlled lighting "Gower-Sieray" lanterns are used. In those positions where symmetrical light distribution is necessary the lanterns used are the "Preston-Sieray" type.

With a few exceptions the units are mounted on ordinary traction standards, the necessary mounting height having been obtained by the lift of the bracket arms. This method of mounting is, however, not without its difficulties, and it is of interest to note that in order to secure uniformity in the positions

Fig 3. A View of the Wimborne Road, Bournemouth, where similar methods of lighting are again used.

light sources in relation to the kerb line, it was necessary to measure the required bracket projection at each individual point and to provide a bracket suitable for each siting position.

The "on" and "off" control is effected by individual time switches, and so arranged that the lighting intensity can be graded throughout the night by using all or any of the lamps as desired.

The installation was carried out by the Bournemouth and Poole Electricity Supply Company, whose engineers displayed considerable ingenuity in devising simple methods of speedy erection. By the addition of tubular scaffolding, for instance, the tower wagon was made to perform the duties of a hoist, as well as its normal function, and the progress of the erection gangs greatly facilitated thereby.

The accompanying photographs give an impression of the quality of the lighting that has been achieved, and we learn that the Bournemouth residents themselves have expressed keen appreciation of the improvements that have been carried out in their midst.

Lighting Luton Town Hall

We are indebted to the General Electric Co., Ltd., for the accompanying illustrations of Luton Town Hall, which was recently opened by H.R.H. the Duke of Kent.

This modern style building makes a fine impression when floodlighted at night, for which purpose twelve floodlights (six 750 and four 1,000 watt) are used, together with two 300 watt lamps in the portico, which are fitted with amber colour-screens and show up the main columns in silhouette. Within the top of the tower a 400 watt Osira lamp is also installed, the blueish light of which indicates when the Council is in session.

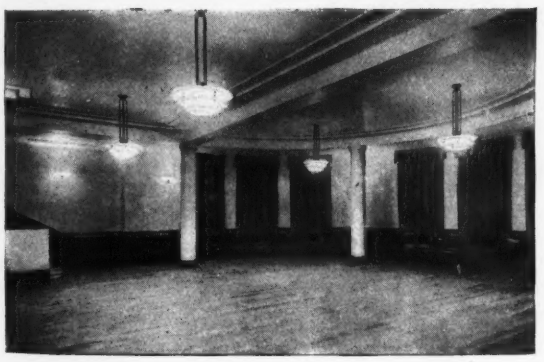


Fig. 1. General view of small hall, showing diffusing lighting fittings.

Fig. 2. Luton Town Hall floodlighted at night.

Totally enclosed polished opal glass diffusing fittings 12, 14, and 16 ins. in diameter are used for the general office lighting. Similar methods are used in the small hall, illustrated in Fig. 1. The chief apartment, however, is the Council Chamber (Fig. 3), which is panelled in walnut and has a fine dome 18 ft. in diameter, specially arranged for natural and artificial lighting. Nine 16 in. reflectors, each equipped with 300 watt lamps spaced 4 ft. apart, 3 ft. 6 in. above the glass, and 23 ft. above the seating accommodation furnish 7 ft.-candles in the well of the chamber.

Fig. 3. The Council Chamber, showing G.E.C. illuminated laylight.

A Large Iris Shutter

Our note in December last on an iris shutter manufactured in this country, stated to be the largest in the world, has brought us a communication from Mr. Frank Benford, of the Research Laboratory of the General Electric Company (U.S.A.) in Schenectady.

Mr. Benford sends us the picture, reproduced above, of one of two 110 in. diameter iris shutters built for the laboratory in 1919. The shutters can be set for any diameter between 4 ins. and 110 ins., and they have been in service for over eighteen years. They are parts of two photometric integrating hemispheres used for testing searchlights and headlights, and for general photometry.

Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

(Continued from Page 51, February, 1937)

I.—RADIATION AND GENERAL PHYSICS.

52. The Visibility of Radiation at Low Intensities.

K. S. Weaver. J.O.S.A., 27, pp. 36-43, January, 1937.

A visibility curve depending on about fifteen observers has been taken at an intensity comparable to the lowest used in dark-room work. A series of determinations of the wavelength of maximum visibility for several intensities and observers has also been made, giving a curve extending from near the dark adapted threshold to about 2-foot lamberts. F. J. C. B.

III.—SOURCES OF LIGHT.

53. The Search for High Efficiency Light Sources.

Saul Dushman. J.O.S.A., 27, pp. 1-23, January 1937.

The subject is discussed mainly from the point of view of the physicist. The author gives a summary of the present status of investigation in the field of light sources, under the following headings: Luminous Efficiency, Incandescent Solids as Light Sources, Luminous Efficiencies of Electric Discharges in Gases and Vapours, Origin of Spectral Lines, Critical Potentials, Probability of Excitation and Ionisation, Life of Excited Atoms and Metastable States, Fundamental Electrical Phenomena in a Discharge, Cathodic Type of Discharge, Electric Temperature, Light Output in Positive Column Discharge, Energy Balance in a Positive Column Discharge, High Pressure Positive Column Discharge Lamps and Transformation of Ultraviolet Radiation into Visible Light. F. J. C. B.

54. Luminous Discharge Lamps.

C. C. Paterson. Elect., 118, p. 131, January 29, 1937.

A summary is given of progress during the past year of the utilisation of existing types of discharge lamps and also of the development of newer types still in the experimental stage. C. A. M.

55. The Status of Vapour Lamps.

L. A. Hawkins. Am. Ill. Eng. Soc. Trans., No. 1, pp. 95-106, January, 1937.

The relative merits of tungsten filament and vapour lamps in efficiency and colour rendering are compared. The use of fluorescent materials is discussed shortly. J. S. S.

56. Cadmium and Zinc Vapour Lamps.

Marden, Beese, and Meister. Am. Ill. Eng. Soc. Trans., No. 1, pp. 84-94, January, 1937.

The luminous efficiency and energy distributions of high and low pressure cadmium and zinc vapour lamps are studies. The colour values of these lamps are compared wth those of mercury arcs, tungsten filaments, and black body radiators. J. S. S.

57. Study of a "Directed Flux" Electric Lamp.

H. Pécheux. El. Times, 91, pp. 35-41, January 9, 1937.

Calculations connected with a lamp of special design in which a given light distribution is obtained by a combination of flutes and a part silvered surface on the lamp bulb. W. R. S.

IV.—LIGHTING EQUIPMENT.

58. Coronation Illuminations.

Anon. Elect., 118, pp. 161-165, January 29, 1937.

Descriptions are given, with numerous photographs, of decorative lighting equipment now available for the Coronation celebrations. C. A. M.

59. Modern Lighting for Modern Transportation.

Helmbright and Lee. Am. Ill. Eng. Soc. Trans., No. 1, pp. 61-83, January, 1937.

Describes recent developments in lighting systems for rail and road transport. Details are given of lighting experiments on full scale models, and of new fixtures now on the market. J. S. S.

60. Luminescence.

J. T. Randall. Elect., 118, p. 183, February 5, 1937.

A summary is given of a recent paper by the author to the Royal Society of Arts on the mechanism of luminescence from various powders and its application to light sources. C. A. M.

61. Problems Concerning the Production of Cathode-Ray Tube Screens.

H. W. Leverenz. J.O.S.A., 27, pp. 25-35, January, 1937.

Most of the described experimental procedures have been developed for producing oxide-type luminescent screens in CR tubes. F. J. C. B.

V.—APPLICATIONS OF LIGHT.

62. Engineering Progress, 1936.

P. L. Alger. G. E. Review, No. 12, pp. 572-587, December, 1936.

A section of this review is devoted to developments in the theory and practice of lighting during 1936. J. S. S.

63. Engineering Research in 1936.

Anon. World Power, 27, pp. 13-14, January, 1937.

A brief report is given of an agreed international method adopted to handle problems of heterochromatic photometry arising from discharge lamps. C. A. M.

64. Prescribing Light and Lighting.

Luchiesh and Moss. Am. Ill. Eng. Soc. Trans., No. 1, pp. 19-60, January, 1937.

The need for certain standards of lighting in relation to human welfare is discussed. The Luchiesh Visibility Meter is described, together with a method of assessing required illumination levels by visibility measurements. J. S. S.

65. Light and Architecture.

Anon. Am. Ill. Eng. Soc. Trans., No. 1, pp. 11-18, January, 1937.

A number of representative architectural lighting schemes are described, with photographs. J. S. S.

66. Washington Schools Lead in Lighting.

Aksel Knudstrup. El. World, 107, p. 298, January 16, 1937.

Details are given of the type of lighting adopted in

new schools, and modernisation of older ones in the area of Washington, U.S.A. High intensities of illumination without glare are becoming general. S. S. B.

67. Mercury Tungsten Lighting Aids Shipyard Draftsmen.

E. C. Alger. El. World, 107, p. 267, January 16, 1937.

As the result of experiment, indirect lighting units combining high pressure mercury vapour discharge lamps and Tungsten filament lamps has been adopted in the drawing office described. Each unit has a separate switch, and venetian blinds are provided for the windows, so that under all conditions constant illumination of daylight colour can be obtained. The author compares the colour components of the light from the combination fitting with that of normal sunlight.

S. S. B.

68. Discharge Tubes for Interiors.

Anon. Elect. Times, 91, p. 73, January 21, 1937.

A description, with photographs, of an interior lighting installation of low brightness discharge tubes at the Royal Star Hotel, Maidstone, red, green, and blue tubes with fluorescent powder coatings are used, and the colour combination is dimmer controlled. The total consumption is about 10 units per hour. W. R. S.

69. Public Lighting at Bournemouth.

Anon. Elect., 118, p. 226, February 12, 1937.

A brief description, with photographs, is given of the new lighting equipment at Bournemouth. Each lantern used houses a mercury vapour discharge lamp and two Tungsten filament lamps. C. A. M.

70. Street Lighting in Fulham.

Anon. Elect., 118, p. 193, February 5, 1937.

A brief description is given of a new installation in Fulham, comprising eight miles of main roads equipped with mercury vapour discharge lamps. Specially designed concrete poles are used extensively. Photographs are given. C. A. M.

71. Sodium Lamps in Australasia.

Anon. El. Times, 91, p. 39, January 14, 1937.

Photographs and a description of a sodium lamp installation at Devonport, New Zealand. The lighted distance is 1.6 miles, with fifty-six 150 watt and twelve 100 watt lamps mounted at heights varying between 27 ft. and 29 ft., and spacings of 110 ft. to 156 ft. Most of the lamps are mounted on 15 ft. brackets, so that they are practically over the centre of the road: the units are of the cut-off type. W. R. S.

72. Industrial Recovery in Australia.

C. E. R. El. Times, 91, p. 3, January 7, 1937.

Gives illustrations and brief description of lighting of motor-car bodies and a system of porthole lighting for an inspection pit. W. R. S.

73. Black Cinema Screens for Rear Projection.

Anon. Ideal Kinema, V., 51, p. 41, February 11, 1937.

Experiments with dark grey and black cinema screens for rear projection have been found to give excellent results. Any loss of light is offset by increased density of shadow, so that the same degree of contrast is obtained as in the ordinary front projection. Moreover, no front light is reflected. This type of screen is believed to have possibilities for television work.

H. M. C.

Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 456,760. "Improvements Relating to Incandescent Filament Electric Lamps."

Siemens Electric Lamps and Supplies, Ltd., and Aldington, J. N. May 14, 1935.

This specification covers an incandescent lamp filament in the form of a helix of the third order (i.e., a filament coiled into a helix, which is again coiled into a second helix, which, in turn, is coiled to a final third helix), in which the internal diameter of each of the three successively formed helices is approximately equal to the external diameter of the body (filament or helix) of which it is formed. The object of the invention is to prevent the filament from sagging.

No. 457,371. "Improvements in and Relating to Electric Discharge Lamps."

The British Thomson-Houston Company, Limited. April 23, 1935. *(Convention, U.S.A.)*

A polychromatic light is emitted by a vapour discharge tube in which the vaporizable material comprises from 2 per cent. to 15 per cent. sodium, 20 per cent. to 85 per cent. cadmium, and 12 per cent. to 78 per cent. mercury. The most pronounced spectral colours are yellow from the sodium, violet, blue, green, and red from the cadmium, and violet and green from the mercury. Good colour contrast is rendered possible, and the light may approximate to day-light. The efficiency may be 35 to 40 lumens per watt.

No. 457,486. "Improvements in Electric Discharge Lamps."

The General Electric Company, Limited, and Jenkins, H. G. May 30, 1935, *November* 27, 1935. *(Cognate Applications.)*

According to this specification in a high-voltage neon discharge lamp operating at a pressure between 2 and 10 mm. of mercury with positive column luminosity and exciting a luminescent material, the luminescent material comprises willemite or cadmium tungstate or a mixture of these. A pink, yellow, or approximately white, light may be obtained.

No. 458,077. "Improvements in or Relating to Electric Incandescent Advertising Lamps."

Caddy, S. C., and Caddy, E. June 5, 1935.

This specification relates to advertising lamps of the kind in which the advertising matter is rendered visible by projection on to a lamp reflector. The lamp bulb is surrounded by two or more sleeves provided with advertising matter, one of the sleeves at least being rotated or oscillated to impart a moving appearance to the matter displayed upon the reflector.

No. 458,139. "Improvements in Directional Light Fittings."

The General Electric Company, Limited, and Debenham, W. F. S. June 26, 1935, *November* 6, 1935. *(Cognate Applications.)*

An asymmetric lighting fitting comprises, according to this specification, a domed reflector which is a surface of revolution and produces no asymmetry in the distribution of the light and a substantially cylindrical or conical skirt below the reflector, the skirt being a glass body bearing prisms with substantially vertical edges.

No. 458,188. "Improvements in Miners or the like Safety Lamps."

Hailwood, E. A. July 18, 1935.

According to this specification, the heat shield which surrounds the oil vessel of a safety lamp is attached thereto at a number of spaced points. It may be corrugated or it may be attached by a ring having air gaps.

No. 458,567. "Improvements in Mirror Projectors for Illuminating Semi-cylindrical Surfaces."

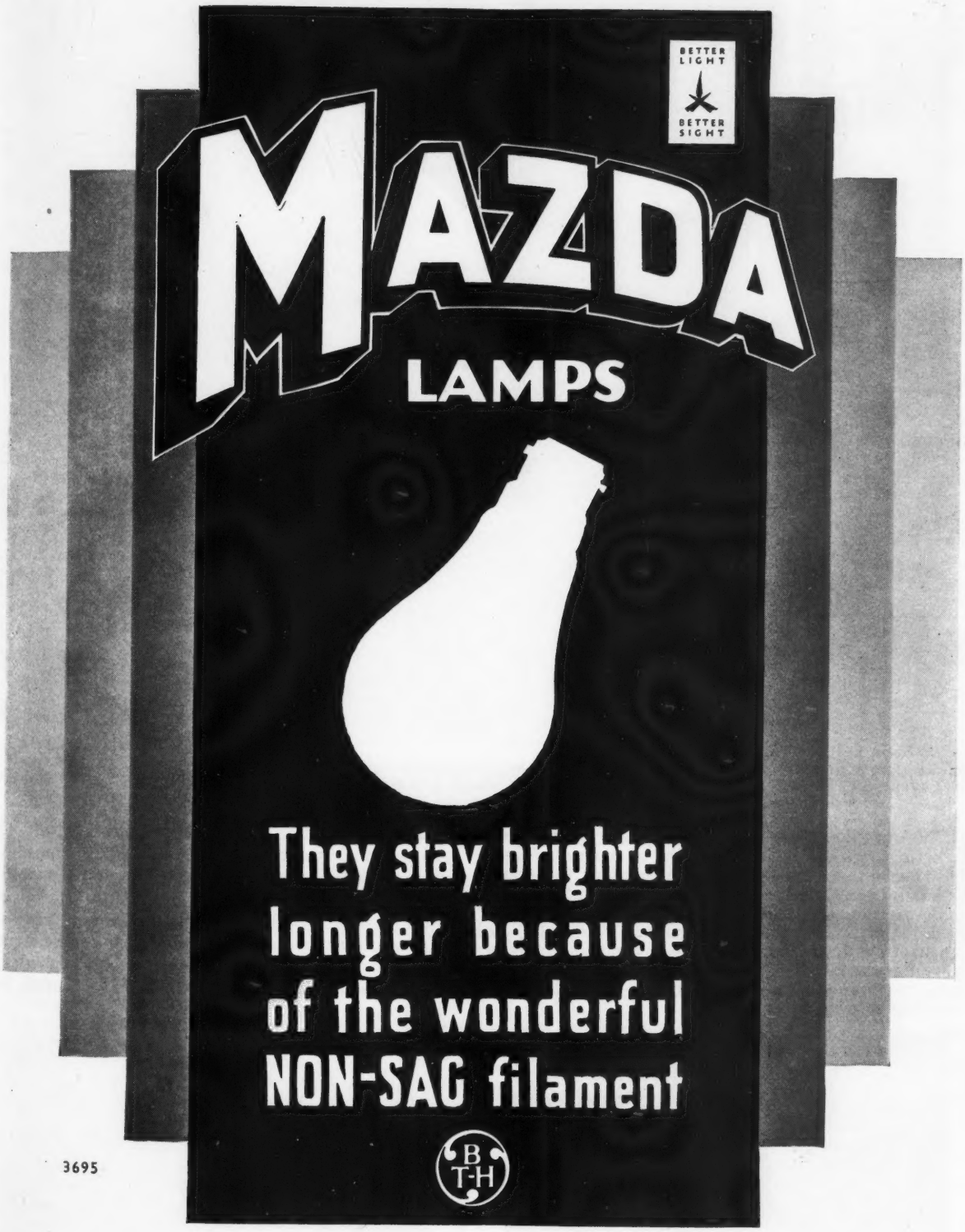
Zeiss Ikon Aktiengesellschaft. June 6, 1935. *(Convention, Germany.)*

According to this specification a mirror reflector, for illuminating a semi-cylindrical surface, as in horizontal stage lighting, from a point source in or near the axis of the semi-cylinder, is so shaped that no reflected light is emitted into the semi-conical space between the source and the bottom of the semi-cylindrical surface. The reflector comprises two halves of bodies of revolution of which the axes coincide with one another and are parallel to or identical with the axis of the semi-cylindrical surface.

No. 458,943. "Improvements in or Relating to Electric Lighting Fittings."

The General Electric Company, Limited, and Stevens, W. A. September 3, 1935.

This specification is directed to a lighting fitting for giving a uniform and shadowless light over a plane surface comparable in area with the fitting, as, for example, over a surgical operating table. The fitting comprises a reflector divided into three parts, *a*, *b*, and *c*, no two parts having a portion in common. Part *a* reflects light from the source to *c*, but not directly to the plane surface. Part *b* reflects light from the source directly to the plane surface, but receives no light from *a*. Part *c* receives no light directly from the source, but reflects to the plane surface light already reflected from *a*. The whole is arranged so that the illumination is diffused and comprises rays that are not even approximately parallel.



3695

MADE IN ENGLAND

THE BRITISH THOMSON-HOUSTON CO., LTD., CROWN HOUSE, ALDWYCH, LONDON, W.C.2.

Up-to-Date Lighting in a Modern Store

GRIFFIN & SPALDING, LTD. *Architects: Messrs. Bromley, Cartwright & Waumsley, AL.R.I.B.A.*

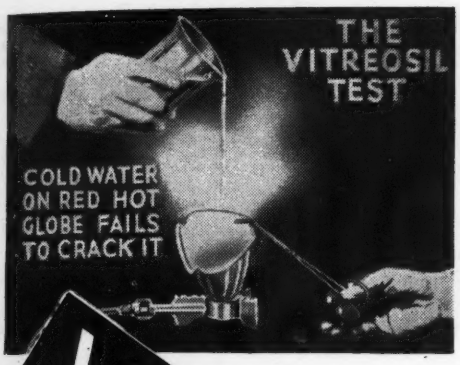
An interesting departure in store window lighting. The false ceiling is of opalescent glass, divided into panels; above this, 300-watt lamps a fixed at intervals of 5 feet. The G.V.D. system of reflection illuminates, with evenly diffused light, the entire display area. The windo are flooded with light, yet there is no possibility of glare, and the goods displayed are seen to the best advantage.

The lighting of a modern store presents many interesting problems. The screening of sources of light in windows, so that the effect resembles the traditional lighting of the stage, is now a familiar practice—in leading stores it is the general rule. The same applies broadly to interiors. In the G.V.D. illustrations here shown several distinct methods of lighting are adopted. The aim in all cases is the same, to produce diffused lighting free from glare, and yielding soft shadows.

It is incorrect to speak of "shadowless" lighti All practical systems of light *do* give shadows—othe wise the effect would be too monotonous, and the might be actual difficulty in distinguishing the ou lines of objects. But the shadows should have s edges, so that forms are revealed in the same manne as by daylight, and all glare must be scrupulous avoided—conditions secured in the installation he illustrated.

The beauty of fine linen is displayed in this scientifically illuminated Linen Hall. The laylights, measuring 8 ft.×4 ft., each contain a single 300-watt lamp. The window seen in this photograph is artificially illuminated.

Adequate light, evenly distributed, and with complete ab of glare, is provided by the indirect units incorporated in columns in the Fabric Hall. Only four 200-watt lamps are used each unit.



ONLY VITREOSIL LIGHTING WARE GIVES THIS MARGIN OF SAFETY

Note the Vitreosil Test. Only Vitreosil Lighting Ware survives this ordeal. Any other lighting glassware, even though it passes the British Standard Specification Test, would be shattered by the shock of sudden cooling from red heat. This means a margin of safety far in excess of the needs of domestic or industrial lighting. It enables Vitreosil Globes, Bowls and Reflectors to be used on high-pressure and super-heated burners without the slightest fear of "flying."

Moreover, smaller shapes can be confidently used, thus concentrating the mantle heat and producing a brighter light which is softly diffused with the minimum loss by passage through Vitreosil.

There is unique beauty in the pearly lustre and satin-like surface of Vitreosil, and the patterns are designed for modern decorative needs.

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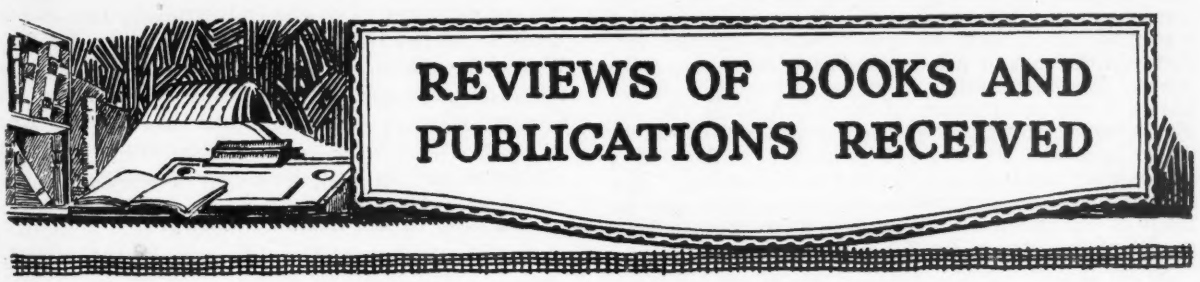
GLOBES · BOWLS · REFLECTORS · · OF PURE FUSED SILICA



REVIEWS OF BOOKS AND PUBLICATIONS RECEIVED

"*The Practical Electrician's Pocket Book*, 1937." (*Odhams Press Tech. Book Dept. Pp.* 532. *Price* 2*s.* 10*d. post free.*)

This little book remains, as we have mentioned before, a miracle of condensed information for its very moderate price. The tables, covering 80 pages, giving particulars of electricity supply undertakings and their voltages, are a useful feature, and the introductory section reviewing progress, by A. P. M. Fleming, covers the ground well. Whilst no new chapters have been added, many of the existing ones have been revised, in which connection Professor C. L. Fortescue has been consulted. The data on photometry and illumination bear evidence of revision. A brief reference is now made to photo-electric instruments. In view of the small space available one should not be too critical. It might, however, be said that if instruments produced by various firms are mentioned by name, care should be taken not to overlook the more important; also that some little warning in regard to possible errors of such instruments (for example, in connection with oblique rays of light and the comparison of lamps having widely different spectra) might be helpful. It is also a question whether the space devoted to illumination could not be used to better advantage. The "recommended illumination intensities" relate exclusively to industrial processes, and eight out of the available twenty-two pages are devoted to familiar tabular data on spacing, room indexes, coefficients of utilisation, etc. —useful, admittedly, but given *in extenso* in text-books, to which a reference might suffice.

"*Modern Cinemas.*" (*The Architectural Press, London.* 1936. *Pp.* 64. *Price* 3*s.* 6*d. net.*)

The contents of this book originally appeared as a special Cinemas Number of the "Architects' Journal," and has been reprinted by request. It contains over sixty pages, almost all bearing photographs and plans of well-known cinemas, with brief descriptive data calling attention to special features. Whilst the data are mainly architectural, many of the pictures illustrate methods of lighting, and, in several cases, there are interesting references to special devices, such as the reflection of the actual screen in a mirror, so that the distance away from the audience is apparently increased. Many of the pictures show striking forms of "architectural lighting." The book should prove of interest to those concerned with illumination, though one rather misses technical data on the lighting. Mr. Sidney L. Bernstein, in his foreword, stresses the importance of co-operation of experts in the planning of cinemas. Cinema architecture, he suggests, has not yet reached the level of the best American and Continental design, and he criticises such characteristics as "hiding hundreds of electric lamps in cornices and corners, thus creating an atmosphere better suited to captive fish than films (with, incidentally, an excessive labour bill for maintenance)."

Some Notes on Lighting at the British Industries Fair (Birmingham)

(Communicated.)

The visit of members of the Council of the Illuminating Engineering Society to the British Industries Fair on February 16 furnished an opportunity for a glance over the stalls, with a view to noting anything of special interest in connection with lighting.

The general lighting of the main hall is by gas, whilst lighting of stalls is mainly electric—except, naturally, where firms concerned with gas lighting make a special display.

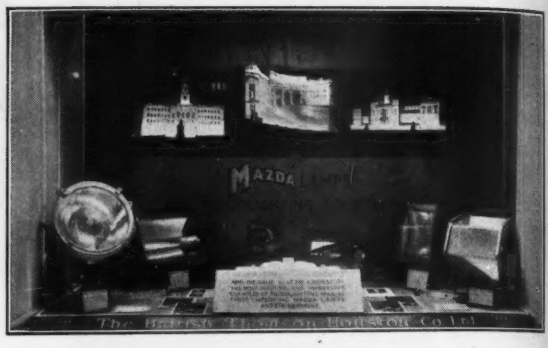
Generally speaking, one received the impression that there was less in the way of lighting exhibits than in former years. Firms with strong local connections, such as Revo Electric, Ltd., and Simplex Electric Company, Ltd., were well to the fore, and good displays were staged by some well-known firms in the electric lighting field as the British Thomson-Houston Company, Ltd., the General Electric Company, Ltd., and L. G. Hawkins and Co. There were, as usual, many exhibits by the smaller firms, in which special devices and gadgets were included. Except for the display of W. Parkinson and Co., Lighting Trades, Ltd., and a few others, one rather received the impression that gas lighting was shown chiefly as an adjunct to heating appliances. Some good examples of modern gas fittings were, however, shown; one might mention, for instance, the pleasing designs of Evered and Co., Ltd., and some effective standard fittings, with decorative shades, at the stall of Lighting Trades, Ltd.

Generally speaking, the lighting of stalls, without having many outstanding features, showed fewer defects (exhibition of bare filaments, etc.) than in former years. In a number of instances effective use was made of lighting equipment, illumination and pictorial devices, or colour contrasts for display purposes. The installation of amber diffusing tubular lamps in the architecture of the E.D.A. stall, the use of striking illuminated photographs illustrating street lighting installations by a number of firms, and the display in black and red of the Wellington Tube Works, were cases in point. Mention might also be made of the effective illumination, from above, of the model of the Port of Bristol.

So far as lighting equipment is concerned, the leading features were again electric discharge lamps and street lanterns, as shown, for example, at the B.T.H., G.E.C., and other stalls. The new 80-watt and 125-watt high-pressure discharge lamps were on view. On this occasion, at the stand of the Preston Corporation, the Siemens Sieray "dual" lamps, first used for street lighting in that town, were on view. There was also displayed at this stall a 5-k.w. searchlight lamp, whilst on the G.E.C. stall a prominent item was the new aerodrome floodlight course-indicating beacon, with a duplicate lamp automatically coming into use in case of failure of the other. At the Revo, Simplex, and other stalls projectors, floodlights, and Coronation lighting equipment were in evidence, a feature being the line of very simple and inexpensive "new flood" projectors introduced by Simplex Electric Company, Ltd. At the stall of Radiovisor Parent there were, us usual, interesting illustrations of the use of light-sensitive devices for the control of lamps, and industrial processes, automatic counting, etc.

One other feature, not without interest, was the increased attention given to plastic lighting equipment, sheets, and moulded bowls and reflectors of synthetic translucent material being shown by several exhibitors.

Coronation Floodlighting



A striking display of Coronation floodlighting equipment in the B.T.-H. Crown House window. Typical Mazdalux Floodlight Projectors are shown in the foreground, while photographic cut-outs of three important buildings, floodlit by the B.T.-H. Company during the Jubilee celebrations, form an appropriate background.

The Illuminating Engineering Society

32, Victoria-street, S.W.1.

INDUSTRIAL LIGHTING SECTION.

PROBLEMS NIGHT.

March 24, 1937, at 7.0 p.m.

6.30 p.m.-7.0 p.m.—Light Refreshments.

On the invitation of the General Electric Company the second meeting of the Industrial Section will be held at Magnet House, Kingsway, London, W.C.2, on Wednesday, March 24, 1937. An opportunity of inspecting the decorative lighting showrooms of the General Electric Company will be afforded from 6.0 p.m. to 6.30 p.m. The following industrial problems will be discussed subsequently:—

1. **Lighting in a Ceramic Industry.**
   Special requirements due to the presence of dangerous dust.
   Speaker: Mr. T. C. ANGUS.

2. **The Equipment of the new Park Royal Works of Messrs. Waterlow and Sons, Ltd.**
   Special Lighting for Printing Processes.
   Speaker: Mr. L. M. TYE.

3. (a) **Belt Sander.**
   (b) **Motor-car Body Inspection.**
   Special Surface Inspection.
   Speaker: Mr. W. IMRIE-SMITH.

4. **Fine Thread-chasing Tool Work on Automatics.**
   Inspection of small screws and tools on automatic screw-cutting machines.
   Speaker: Mr. J. E. LANE.

5. **Polishing of Stainless Steel Sheets.**
   A Survey of Experimental Lighting employed for this occupation.
   Speaker: Mr. E. L. CALVERT.

Visitors are welcome.

Improved Lighting at New Scotland Yard

A few months ago we referred casually to the improved lighting at New Scotland Yard (London). The accompanying illustrations, which comprise views both of the Embankment exit (a) and of the Whitehall exit (b), show the effect of the new equipment. The illumination of both exits and the quadrangle is now provided by 500-watt Siemens Sieray-Dual lamps in diffusing lanterns. (Most of our readers will not need to be reminded that these units combine an electric discharge lamp with a filament lamp in series, and thus furnish some degree of colour-correction in a very economical manner.)

Those who have had an opportunity of inspecting the installation will have noticed the good diffusion of light achieved. New Scotland Yard, the headquarters of the C.I.D. and the Metropolitan Police, is, of course, a very important organisation. Flying Squad police cars have to be ready to leave at a moment's notice, and it is essential that the illumination should be such as to enable them to get off with a minimum of delay.

Light Control in Transport and Industry

The wonderful method of controlling machines by the aid of light-sensitive cells is making continual progress. The use of such cells to control street lamps, which are automatically turned on whenever daylight fails, and to operate illuminated island refuges, guardposts, and bollards is familiar. So, too, are such devices as the industrial smoke indicator, counting and race-timing apparatus and "invisible ray" burglar alarms.

Experiments are continually being made with the process on the Underground Railways. The device whereby lights below the platform are automatically turned on whenever a train enters a station was mentioned at a recent I.E.S. meeting. Another application that is less generally known, however, is the control of escalators according to the volume of traffic. A light-sensitive counting mechanism observes the number of people using the escalator and automatically increases its speed when there are signs of a rush.

Literature illustrating many applications of the process were on view at the stall of Radiovisor Parent, Ltd., at the British Industries Fair.

Light-sensitive cells play their part in many other fields. In the new Mersey tunnel they achieve quite a number of purposes, counting the passage of vehicles, giving warning when the height of an approaching vehicle is too great for it to enter the tunnel, and quickening the ventilation when the development of haze within the tunnel shows the need for extra effort.

One of the most recent applications shown at the Radiovisor stall was for the accurate control of electric bar heating machines. Control by timing or pyrometric devices are here hardly applicable, but control can be effected by the aid of a photo-electric cell—in this case, however, responding not to the ultra-violet, but to the infra-red radiation emitted by the heated bar.

Electric Street Lighting

In Accrington an expenditure of £10,000 on electric street lighting has been approved.

On January 28 an installation of ninety-three 500-watt incandescent lamps, 25 ft. high, 40 yds. apart, and with 6 ft. overhang, was formally opened at Ashton-under-Lyne. The committee, after tests with mercury and sodium discharge lamps, decided to continue with gas-filled filament lamps. The fittings can, however, be readily converted if desired.

Proposals for improved electric lighting at Brentford involve seventy-seven 400-watt mercury discharge lamps, 25 ft. high, spaced at 120 ft., on trolley-bus poles (£1,284), and 1,000 200-watt lamps on standards (£9,510). Additional lighting in Chiswick will involve £3,440, and further extensions are in prospect.

Since April 1 ninety-eight sodium electric discharge lamps have been installed in Derby.

The new system of lighting with electric discharge lamps in Fulham, inaugurated on February 1, is described elsewhere (see p. 74).

In Hornsey a £40,000 scheme for electric lighting has been approved. Discharge lamps will be used on main roads and 'bus routes (Class D standard), incandescent lighting on side roads (Class E standard).

In Stoke Newington fifty-one 250-watt mercury lamps are being installed.

Lambeth has accepted a £23,000 scheme involving over 1,000 electric discharge lamps in the southern portion of the borough, and is increasing its annual public lighting expenditure from £27,000 to £37,000. This is believed to be the first instance of electric discharge lamps being used in every side street in an area.

In Poole the council has approved acceptance of tenders for improved electric lighting at an estimated cost of £9,583.

In Stretford the council has approved a £12,000 scheme for lighting all main roads by mercury discharge lamps. Dangerous crossings and corners will, however, be lit by sodium lamps. Over 500 new lamps, to be spaced about 105 ft. apart and with a 6 ft. overhang, will be needed.

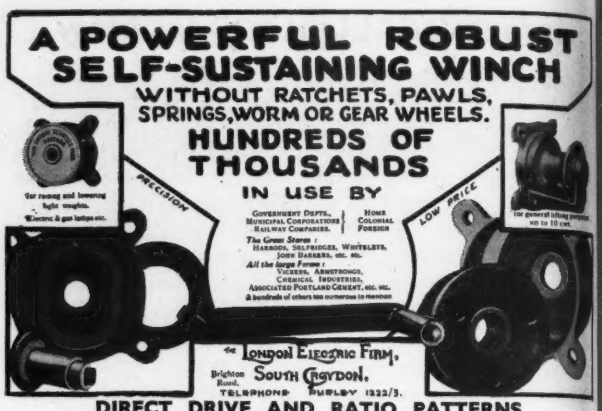
THE CORPATACT MANUFACTURING COMPANY beg to advise their numerous Clients that they are specialists in the manufacture of all types of Capacity Operated Switch Gear, and undertake the design and manufacture of Electrical Mechanical equipment requiring expert staff.

Specialists in Burglar Alarm equipment, manufactured under our own Patents. Enquiries invited. Capacity operated switches for Window Lighting.

Only Address :—

THE CORPATACT MANUFACTURING CO., IVER, BUCKS.

Owners of the registered Trade Mark "CORPATACT."



DIRECT DRIVE AND RATIO PATTERNS

Will not run back. No wheels to get caught in. Sizes to 10 cwt. smallest wall space, side or front driving, also special types including multi-division barrels, combined horizontal and vertical operation.

Siemens Street Lighting Contracts

We learn that the Metropolitan Borough of St. Pancras is proceeding with a scheme to improve the lighting of Euston-road (London). Siemens "Sieray" electric discharge lamps and equipment are to be used. The wider sections of the road, in which pedestrian islands exist, are being treated as though they were separate roads, points being sited on the islands as well as on the kerbs.

One hundred and twenty "Sieray" electric discharge points, of which thirty-four will carry two lanterns each, will again figure in an installation on the Barking by-pass road and River-road, for which a tender by the Borough of Barking has been accepted.

Supplementary Lighting for Better Seeing

A useful leaflet recently issued by the Westinghouse Electric and Manufacturing Company (U.S.A.) emphasises the advantages of supplementary local lighting. The merits of miniature local lighting units for fine work, or where special shadow conditions are desired, were illustrated in Mr. Murray's recent I.E.S. paper. It is interesting to see similar methods being pursued in the United States. The leaflet illustrates "indirect plus illumination" in the drawing office as well as direct, local concentrated lighting for various industrial illumination operations. Additional indirect lighting from local units is a somewhat novel development.

L.A.E.U. Handbook

A useful and well-got-up handbook has been issued by the London Associated Electricity Undertakings, Ltd. There is a two-page map showing the positions of the various showrooms and the areas controlled. The most important part of the booklet, from the consumers' standpoint, is that in which the new two-part tariffs, reduced hire charges, and increased hire-purchase facilities are set out. The handbook also contains particulars of facilities for free and assisted wiring and other services offered by the L.A.E.U.

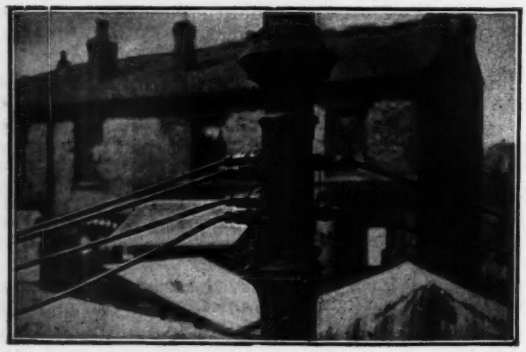
I.E.S. Annual Dinner

Trocadero Restaurant
Tuesday, March 16th
6.45 for 7.30 p.m.

"Yet, Yet There Is Time, O Athenians"

Mirror Pictures for Cinema

Glass is used as the chief decoration in the new Gaumont Cinema, Haymarket, which was opened on Thursday, February 4. In the main entrance vestibule the principal feature is the picture of a dancing girl on a mirror in an illuminated niche, with curved sides of champagne vitroflex. This feature is surrounded by worked mirror glass. The lavatories are lined throughout with vitrolite, the colours being green and primrose. The glass was supplied by Pilkington Brothers, Ltd., of St. Helens.



A "Niphan" market lighting installation, showing main feeding sockets fitted to a lamp standard.

MARKET LIGHTING with the NIPHAN System

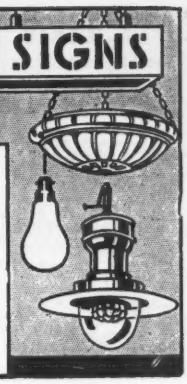
FOR some years we have been collaborating with public lighting authorities in devising temporary lighting installations for market stalls. The picture shows part of a "NIPHAN" market job, in which 6 sockets, in conjunction with a fuse board, were mounted on a lamp standard, with plugs leading to 3-way tees and suspended through sockets.

● Our extensive market lighting experience is at your disposal.

Announcement of SIMMONDS & STOKES Ltd., Victoria House, Southampton Row, London, W.C.1. Tel. : Holborn 8637. 'Grams : "Niphon, London."

NIPHAN

·WHERE TO BUY·
A DIRECTORY OF LIGHTING EQUIPMENT



We invite applications for spaces in this new section of the journal. Particulars of terms for each space (approx. 1 inch deep and 3½ inches wide) are given below.

These terms are equivalent to **half our ordinary advertising rates**, but not less than 12 successive monthly insertions can be accepted on this basis, and amounts are payable in advance.

Payment for an advertisement in this section entitles the advertiser to receive *Light and Lighting* during the period of the contract.

Terms:					
12 Successive Monthly Insertions	£3 10 0	Payable
24 " " "	£6 0 0	in
36 " " "	£8 10 0	Advance

1

MODERN LIGHTING FITTINGS
New Catalogue on application
Fittings manufactured to Architects' Specifications
ASCOG LIMITED
Ascog House, 44, Theobalds Road, LONDON, W.C.1

2

PHOTOMETRIC EQUIPMENT for technical, lighting, and scientific research
ALEXANDER WRIGHT & CO., LTD.,
WESTMINSTER, S.W.1

3

ALLOM BROTHERS LTD.
16, GROSVENOR PLACE, LONDON, S.W.1.
Specialists in the Science of Modern Lighting, including:
Theatres and Public Halls. Tennis and Racquet Courts.
Pictures and Picture Galleries. Floodlighting, etc.
Decorative Fittings in Glass and Metal.

4

Take no risks— specify **BENJAMIN PLANNED LIGHTING**
THE BENJAMIN ELECTRIC, Ltd., TARIFF ROAD, N.17

5

MAZDA LAMPS and B T H LIGHTING EQUIPMENT
Our Illuminating Engineers will be pleased to advise you on any street or floodlighting problem
THE BRITISH THOMSON-HOUSTON CO., LTD., Crown House, Aldwych, W.C.2

6

BROMFORD
Seamless Steel Lighting Standards
for all requirements
BROMFORD TUBE CO., LTD., ASTON, BIRMINGHAM

7

BOOKS
PLEASE send for Detailed list of Books on Illuminating Engineering and allied subjects, post free, from:
CHAPMAN & HALL, Ltd., 11, Henrietta St., London, W.C.2

8

THE REINFORCED CONCRETE LAMP COLUMNS SPECIALISTS.
CONCRETE UTILITIES, Ltd.
WARE, Herts.

9

CRYSTAL CHANDELIERS
AND
SILVERED GLASS REFLECTORS
— DIRECT IMPORTERS —
PLEASE WRITE FOR CATALOGUE AND TERMS:
CRYSTAL & INDUSTRIAL FITTINGS Co., 72 Shoe Lane, Fleet Street, E.C.4. Telephone: CENTRAL 7340.

10

Curtis Lighting
COMPANY OF GREAT BRITAIN LIMITED
OFFICES: ALDWYCH HOUSE LONDON W.C.2. WORKS: PONDERS END MIDDLESEX.
Manufacturers of **X-Ray Reflectors**

11

DAWSON REFLECTORS
Indoor and Outdoor Floodlights
JENA REFLECTOR FITTINGS
Miss E. H. DAWSON & HENCKEL,
42, Gray's Inn Rd., London, W.C.1
Telephone: Chancery 7751/2

12

Specialists in
ARCHITECTURAL ILLUMINATION AND DESIGNS
DRAKE & GORHAM LTD.
36, GROSVENOR GARDENS, LONDON, S.W.1
Manchester, Glasgow, Hereford and Winchester.

13

ELECTRICITY SERVICES LTD.
Sole Proprietors and Patentees of the "**ALL PURPOSES**"
TYPERLITE LOCAL LIGHTING UNITS
86, Cannon St., LONDON, E.C.4
Mansion House 5294 (3 lines)

14

"ESLA"
BI-MULTI AND MULTIPLANE REFLECTORS
Lanterns, Brackets, Columns, Switches and Fuse Boxes, etc., FOR STREET LIGHTING
The Electric Street Lighting Apparatus Co.
The Foundry, Canterbury

15

ELM WORKS, LTD.
Established 1903 Summerstown, London, S.W.17
Suspension Lamps, Lanterns, **REFLECTORS**
for **PUBLIC & INDUSTRIAL LIGHTING**
GAS and ELECTRIC
VITREOUS ENAMELLING Sheet Metal Work, Metal Spinning, &c.

16

ENGINEERING & LIGHTING EQUIPMENT CO. LTD.
SPHERE WORKS,
ST. ALBANS, HERTS.
TELE. 258
DISCHARGE LIGHTING
FITTINGS FOR
ALL PURPOSES

17

PHOTOMETERS
PHOTO-ELECTRIC
BENCH, CUBE, STREET and PORTABLE TYPES
FOR CANDLE-POWER AND ILLUMINATION TESTS
EVERETT EDGCUMBE Colindale Works LONDON, N.W.9

18

FARADAY HOUSE
TESTING LABORATORIES
All kinds of Lamps, Reflectors, etc., Tested
LAMPS TESTED TO B.S.S. No. 161, 1934
SCALE OF FEES ON APPLICATION TO THE SUPERINTENDENT
66, SOUTHAMPTON ROW, W.C.1

19

FLOODLIGHTING & FITTINGS
LTD.
294, GRAY'S INN ROAD, W.C.1
Manufacturers of "FLOOD" Units
Specialists in Modern Lighting Fittings
Telephone: TERMINUS 5954

500/1000 Watts
Model "B"

20

FOSTER & PULLEN Ltd.
make all types of Lanterns for Street Lighting
BY GAS
Samples for trial willingly sent—we invite comparison on both cost and quality
AVIL WORKS **BRADFORD**

21

GOWSHALL LTD. for "Guardian Angel" Illuminated Guard Posts & M.O.T. Signs.
London Office and Works
14-15 LAMBS CONDUIT PASSAGE, RED LION SQUARE, LONDON, W.C.1
Telephone CHAncery 7042 and 7845
Head Office and Works
CHESTON ROAD, ASTON, BIRMINGHAM 7 Telephone EAST 1426

22

TH GUNFIRE (Trade Mark)
PIONEERS of AUTOMATIC LIGHTING
GAS CONTROLLERS, ELECTRIC, and SYNCHRONOUS TIME SWITCHES
Manufactured by:—
BRITISH, FOREIGN AND COLONIAL AUTOMATIC LIGHT CONTROLLING CO., LTD., BOURNEMOUTH

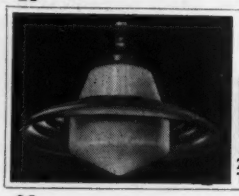
23

Aldwych House, London, W.C. **G·V·D** *Telephone: Holborn, 7277-8*
FOR BETTER LIGHTING

24

"HAILWARE!"
BRITISH MADE ILLUMINATING GLASSWARE AND FITTINGS. TRAFFIC GLOBES AND SIGNS, ISLAND COLUMNS AND FOOTLIGHTS.
HAILWOOD & ACKROYD, Ltd.
BEACON WORKS, MORLEY, Near LEEDS.
Branches and Showrooms:
71/75, New Oxford St., London, W.C.1. 314, St. Vincent St., Glasgow, C. 3.
31, Colmore Row, Birmingham.
Ulster Agents: Messrs. Bell & Hull, 17, College Street, Belfast.

25



Decorative, Architectural and Commercial Lighting Fittings and Equipment.
Harcourts LIMITED
21a Newman St., Oxford St., London, W.1.
Telephone: Museum 8732/3/4 H.L. 50

26

EVERY TYPE OF MODERN
LIGHTING
BY
L. G. HAWKINS & CO., LTD.,
30-35, DRURY LANE, W.C.2

27

SCIENTIFIC Holophane TRADE MARK ILLUMINATION
The Hall-Mark of Good Lighting

28

NEWBRIDGE
GAS CONTROLLERS AND ELECTRIC TIME SWITCHES.
FOR STREET LIGHTING AND INDUSTRIAL PURPOSES.
Manufactured by:—
THE HORSTMANN GEAR COMPANY, LIMITED,
NEWBRIDGE WORKS—BATH
'Phone:—7241/2. 'Grams:—Horstmann, Bath.

29

INDUSTRIAL, COMMERCIAL STREET AND RAILWAY LIGHTING EQUIPMENT of Scientific Design and Superior Quality.
KANDEM ELECTRICAL Ltd.
769 Fulham Rd., London, S.W.6

30

UP-TO-DATE
Street Lighting Equipment
C. H. KEMPTON & Co., Ltd.,
Stangate House, 235, Westminster Bridge Road, London, S.W.1

31

LINOLITE *for Show Cases*
LINOLITE LTD., 96 VICTORIA STREET, S.W.1

32

MEK-ELEK Engineering Ltd.,
16, Douglas Street, LONDON, S.W.1
Victoria 5707. Cables: Mekelek, London

33
W. PARKINSON & CO
PROMOTERS OF SCIENTIFIC STREET LIGHTING BY GAS
Our Research Lighting Bureau will solve your problems
IRON LANE · STECHFORD · BIRMINGHAM
Tel. No.: Stechford 2256. And at London and Belfast.

34
PEARCE NEON
THE SIGN OF A GOOD SIGN
NEW CROSS 3880-1-2

35
F. H. PRIDE *(Herbert C. Pride, M.B.E.)*
ILLUMINATING ENGINEER
CINEMA LIGHTING SPECIALIST
Designer and Manufacturer of MODERN Lighting Fitments and Electrical apparatus.
Works and Showrooms: 69/81, High St., Clapham, S.W.4. 1, St. Lukes Road, Clapham, S.W.4. *Telephone: Macaulay 2281/2.*

36
RADIOVISOR PARENT, LTD.
28, LITTLE RUSSELL STREET, LONDON, W.C.1.
LIGHT ACTUATED APPARATUS
CONTROL OF STREET, FACTORY, AND SIGN LIGHTING.
SMOKE INDICATOR AND RECORDER.

40
PHOTO-ELECTRIC CELLS
Selenium Layer Type (Brit. Pat.) round or Rectangular, for all kinds of light-sensitive apparata.
STAFFORD & LESLIE,
ARMOUR HOUSE, ST. MARTIN'S-LE-GRAND, LONDON, E.C.1.
Tel. National 5025.

41
STRAIGHT-LITE REFLECTORS, LTD.,
73, CANONBURY ROAD, LONDON, N.1.
DESIGNERS AND ACTUAL MANUFACTURERS OF MODERN :: FITTINGS AND ARCHITECTURAL LIGHTING UNITS ::
Telephone: CANonbury 2066 (two lines).

42
STRAND ELECTRIC
AND ENGINEERING Co. LTD.
SPECIALISTS IN COLOUR LIGHTING and STAGE EQUIPMENT
LIGHTING FOR EVERY OCCASION
THEATRES: EXHIBITIONS
FLOODLIGHTING: CINEMAS
BALLROOMS: PAGEANTS
19-24 FLORAL ST. LONDON, W.C.2

43
For every type of GAS LIGHTING
SUGG WESTMINSTER
When you want the best!
CHAPTER ST. S.W.1

Index to "Where to Buy"

N.B.—The numbers are those attached to individual entries in the Directory (See pp. 87-90.)

37
SIEMENS
38-39, UPPER THAMES STREET, LONDON, E.C.4
ELECTRIC LAMPS of all types. "SIERAY" ELECTRIC DISCHARGE LAMPS. ELECTRIC LIGHT FITTINGS. FLOODLIGHTING APPARATUS. SHOP-WINDOW LIGHTING EQUIPMENT. STORE LIGHTING. INDUSTRIAL LIGHTING, CINEMA LIGHTING, ELECTRIC SIGNS, ETC.

38
NIPHAN
PLUGS, SOCKETS, TEES, COUPLINGS, TERMINAL SOCKETS AND JOINT BOXES
for every portable and temporary lighting requirement.
SIMMONDS & STOKES, LTD.
VICTORIA HOUSE, SOUTHAMPTON ROW, LONDON, W.C.1
Phones: (Head Office) Holborn 8637; (Works) Putney 1364

39
WASK
PATENT SELF SUSTAINING
WINCHES
FOR ALL PURPOSES
Quick hoisting with little effort
MADE IN TWO SIZES
Walter Slingsby & Co. Ltd., Keighley

44
ARCHITECTURAL ILLUMINATION
"BARLUX" TUBELAMPS
TUBELIGHT SALES LTD · 23 PANTON ST · S.W.1

45
ULTRALUX
LIGHTING FITTINGS
TROUGHTON & YOUNG LTD.
143 KNIGHTSBRIDGE

46
WARDLE ENGINEERING Co., Ltd.
OLD TRAFFORD, MANCHESTER, 16.
STREET LIGHTING EQUIPMENT. FLOODLIGHT PROJECTORS
WORKSLITE REFLECTORS. WARDELYTE GLASSWARE
PRISMALUX DIRECTIONAL UNITS.

47

We invite Enquiries from Readers or Particulars of "Wants" such as might be satisfied by Advertisers in this Directory.

G.E.C. Branch at Plymouth

The G.E.C. premises in Union-street, Plymouth, have recently been rebuilt. The building has been raised from two to four floors. The new floors have trebled the capacity of stock room at the branch, and the new arrangements afford improved facilities for window display.

Quick Work

Following a fire on February 19, 1937, at the British Thomson-Houston Company's Mazda Lamp Depot at 6, West-street, Southampton, it became necessary, in view of the extensive damage, to transfer this depot temporarily to new premises at 3, East-street, Southampton. Telephone: Southampton 4389.

To obviate any inconvenience to customers, the B.T.-H. Company, when notified of the fire on Saturday morning, at once sent a representative to Southampton to find new premises and to make immediate arrangements for the transfer of stock, furniture, and records. Replacement stocks of all types of Mazda lamps were rushed by express delivery vans from London, and a special staff worked throughout the week-end organising the new premises.

It is a striking indication of B.T.-H. service that the temporary depot was opened for normal business at 8.30 a.m. on Monday, February 22, although the first intimation of the fire was only received in London at 9.30 a.m. on February 20.

Catalogues and Advertising Literature

We invite all firms in the Lighting Industry to send us new catalogues as they appear, for reference in these columns.

CROMPTON, PARKINSON, LTD.—Catalogue-leaves illustrating Crompton lighting units, including R.L.M. Dispersive Reflectors, concentrating and elliptical reflectors, Glassteel Diffusers, Duoflux floodlights, industrial and show window lighting units, etc.

CURTIS LIGHTING COMPANY OF GREAT BRITAIN, LTD.—Leaflets illustrating Curtis Floodlights; "Attraction-Zone" Show Window Lighting, etc.

EDISON SWAN ELECTRIC CO., LTD.—Catalogue of Coronation lighting equipment and floodlighting; includes illustrations in colour (amongst them a truly gorgeous illuminated fountain).

HOLOPHANE, LTD.—Leaflets illustrating vertical burning, long-range and wide-angle projectors.

KANDEM ELECTRICAL, LTD.—Leaflet dealing with Coronation floodlighting.

METROPOLITAN VICKERS ELECTRICAL CO., LTD.—Illustrated booklet describing Metrovick Electric Discharge Lamps (mercury and sodium) and lanterns and floodlights.

SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.—Illustrated catalogue, with colour inset, featuring Coronation floodlighting and equipment.

Benjamin Appointment

We learn that as and from February 22 Mr. J. W. Davis is representing Benjamin interests as their lighting sales engineer in the North-Eastern Territory.

AUTHENTIC INFORMATION

The ELECTRICAL REVIEW

FOUNDED 1872

The authoritative record of technical and business news in the Electrical Industry.

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"LUX"

(La Revue de l'Eclairage)

WE have pleasure in announcing to our readers that we have entered into an arrangement to receive subscriptions for the French Journal "Lux" (La Revue de l'Eclairage). The subscription per annum is 30 francs, the approximate equivalent of which in English money is Seven Shillings and Sixpence (7/6).

"Lux" is the only French journal which specialises in all aspects of Lighting; it is the official organ of the Association Française des Ingenieurs de l'Eclairage (equivalent to the Illuminating Engineering Society in France).

It furnishes a complete record of interesting developments in lighting in France and on the Continent. It is fully illustrated and in particular devotes a considerable number of its pages to Decorative Lighting.

By studying these articles and the numerous photographic reproductions of modern lighting installations the reader can readily gain an excellent impression of French methods and practice in matters of Illumination.

Applications for subscriptions will be received by "Light and Lighting" 32, Victoria Street, London, S.W.1.

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THE ELEMENTS OF GOOD LIGHTING

WHY AN UP-TO-DATE PRINTER CHOOSES GAS

There are still many people who associate gas lighting with antimacassars and aspidistras and do not realise that it has made as much progress as other forms of lighting. It may, therefore, come as somewhat of a surprise to such people to find such progressive printers as Messrs. George Reveirs, Ltd., choosing gas lighting for their new works at Rosebery-avenue, E.C.1, after going very thoroughly into the matter.

It should not be surprising, when it is remembered that the principal streets of Westminster, including Whitehall, are lit by gas. Observant people, especially motorists, comment upon these streets as the best lit in London.

Let us consider these advantages that induced Messrs. George Reveirs, Ltd., to adopt gas lighting.

It's real light that matters

The amount of real visibility given by a lamp depends not only on the candle power of that lamp but also on the colour properties of the light, on the absence of glare and on its diffusive power. In other words, the nearer we get to daylight the better. The ordinary incandescent gas mantle gives light which approximates more nearly to daylight than any other commercial artificial illuminant. It shows things up in their true colours and reduces eyestrain. By using "daylight" mantles an even nearer approach to natural daylight is achieved.

The source of brilliance in gas lighting is so large that glare is almost entirely absent. During the floodlighting display in London everybody remarked upon the beautiful soft, diffused light given by the gas floodlighting.

Reliability

Another important consideration is reliability. Gas lighting has never been known to fail. Therefore expensive emergency lighting installations are quite unnecessary. A district "black-out" can be, and has been, a cause of serious loss and disorganisation to printers and newspapers.

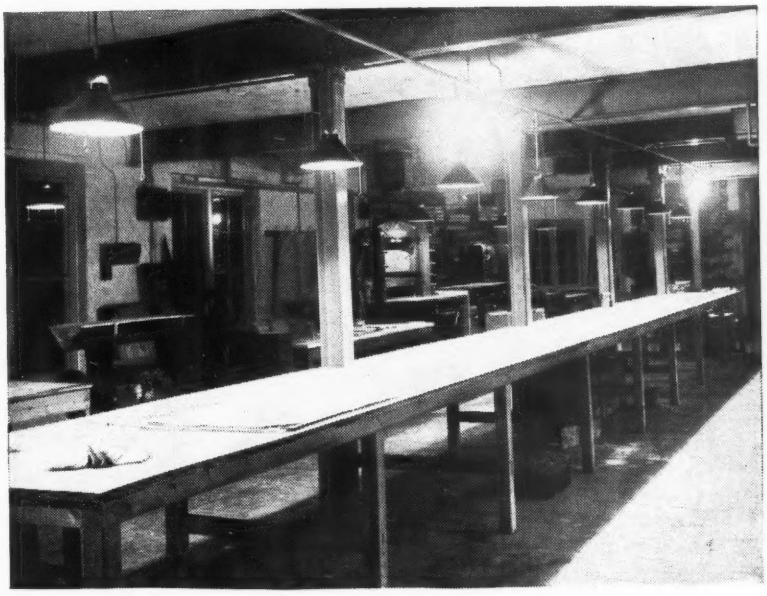
As for convenience, catalytic control has given the gas lamp the wall switch so that it can be lit in an instant from the doorway of the room, or other convenient point of control.

Then comes the question of cost, and here again gas scores heavily For a similar amount of effective illumination gas is cheaper than other illuminants, or, alternatively, for a given expenditure a larger amount of effective illumination can be produced by gas than by any other means, a point of some importance in view of the tendency towards higher illumination values. Then again, gas mantles cost less, they last longer, and their depreciation in candle power is almost negligible.

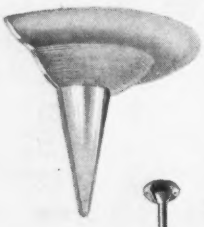
Gas lighting assists heating

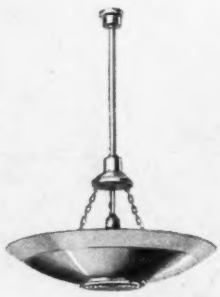
Another factor to be considered when comparing cost is the appreciable amount of warmth given by gas lamps. This saves on the heating fuel bill, and Messrs. George Reveirs find that the gas lighting gives sufficient warmth in spring and autumn to obviate the necessity of running the central-heating plant. This heat is used on some machines to dry the sheets as they are passed out.

These considerations show that there is a very strong case for gas lighting, and anyone in the position of choosing the lighting for a building would do well to obtain expert advice on the subject. This can be obtained by writing to the British Commercial Gas Association, at Gas Industry House, 1, Grosvenor-place, London, S.W.1, who will provide the information or put the enquirer in touch with the body best equipped to assist him. [ADVT.



Gas lighting in the binding and folding room of a modern printing works.





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and in the end

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